Regional Residential Propane Model

Draft April 13, 2005

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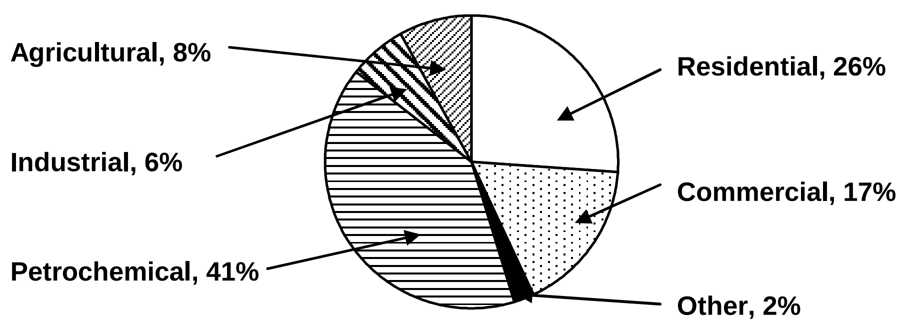
1. Overview of Regional Residential Propane Model

Propane is consumed in several different sectors, including residential, commercial, petrochemical, industrial, and agricultural (Figure 1). Other applications, which account for the remainder of propane demand, include use as fuel in internal combustion engines (generators, pumps, and fork lifts) and in gas utility peak-shaving.

Figure 1. Propane End-User Market Shares, 2002

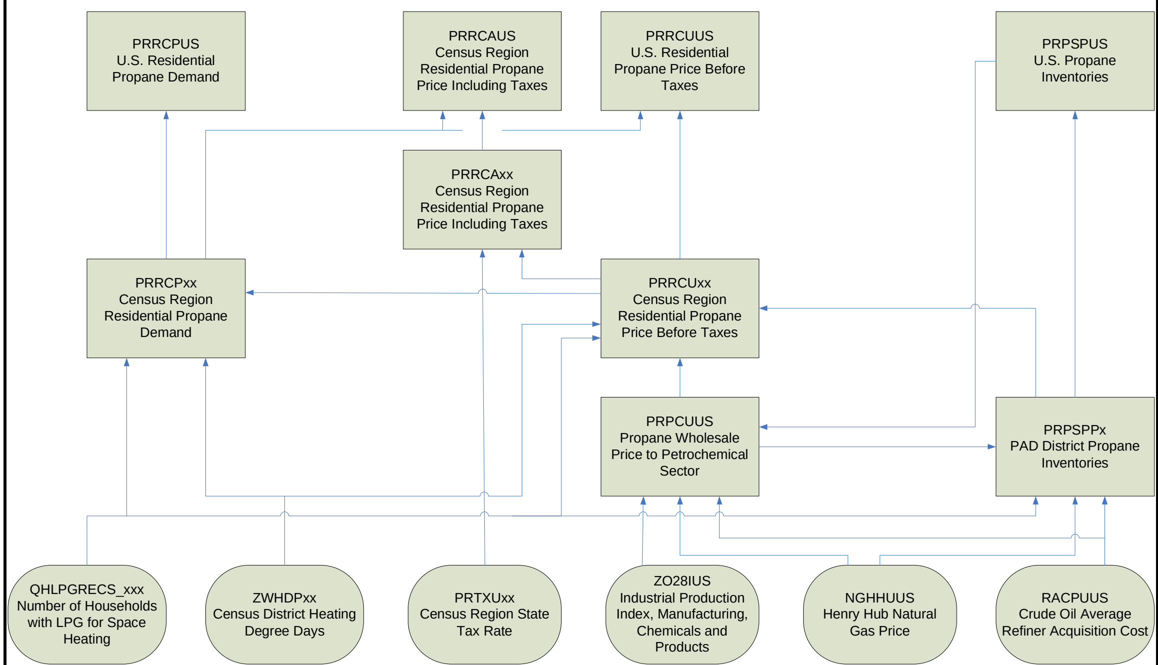


Source: American Petroleum Insitute, 2002 Sales of Natural Gas Liquids and Liquefied Refinery Gases, November 2003, Table 4, pp. 6-7.

Propane ranks as the fourth most important source of residential energy in the Nation, with nearly 5 percent of all households using propane as their primary space heating fuel (Energy Information Administration, *2001 Residential Energy Consumption Survey*, Table HC1-9a). Propane is also used by households for water heating and cooking.

The objective of the regional short-term residential propane model is to generate residential price forecasts for the four census districts: Northeast, South, Midwest, and West (see Appendix A1 for map). Regional residential propane prices are estimated as a function of the wholesale propane price to the petrochemical sector, regional stocks, and weather (Figure 2). Regional residential propane prices are then aggregated to the U.S. level by weighting regional prices by estimated regional demands.

Figure 2. Regional Residential Propane Model

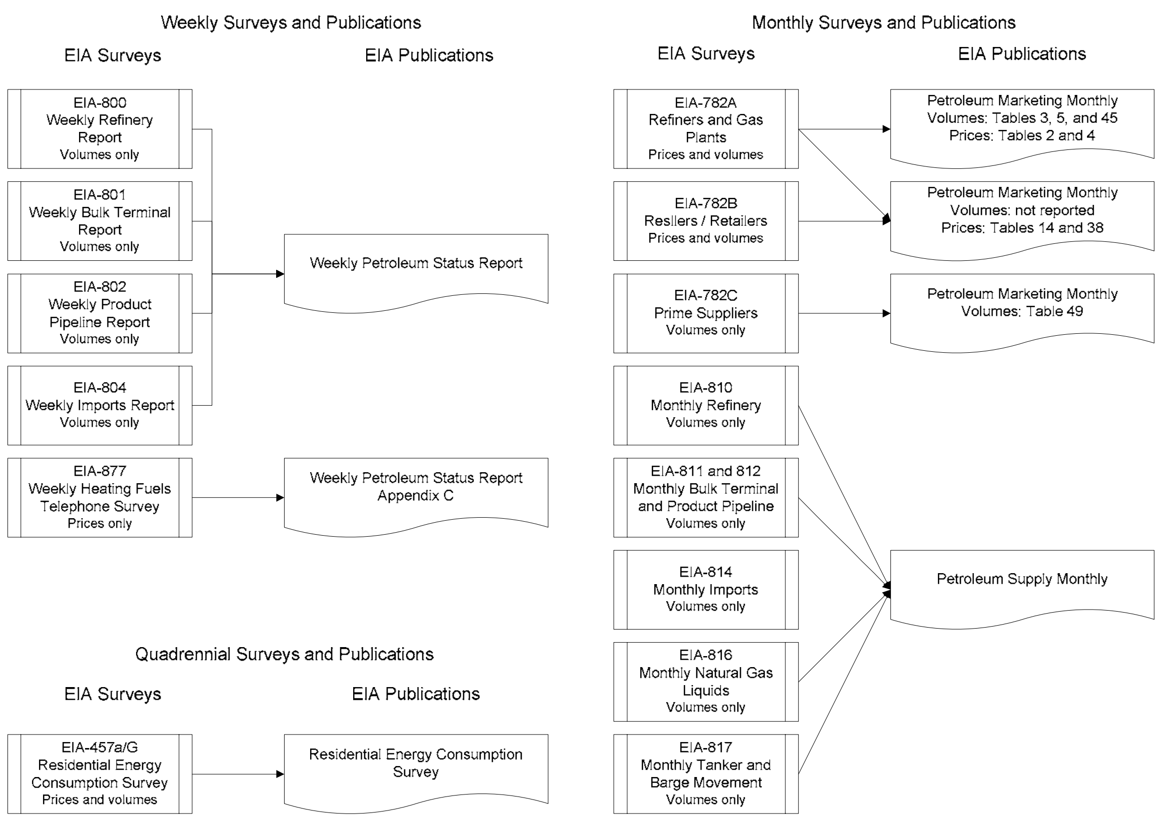


Key: PRRCPxx, PRRCUxx, PRTXUxx, and PRRCAxx, where xx = census region;
PRPSPPx, where x = petroleum for administration defense district (PADD);
QHLPCRECS_xxx, where xxx = census district; and ZWHDPxx, where xx = census district

2. Data Sources

The monthly volume and price data used in the regional propane model appear in two EIA publications: the Petroleum Supply Monthly (PSM) and Petroleum Marketing Monthly (PMM) (Figure 3). Weekly regional inventory data published in the Weekly Petroleum Status Report (WPSR) are used for the most recent two months where monthly data is not yet available. A monthly time series of the number of homes with LPG as the main space heating fuel is derived by linear interpolation from the quadrennial Residential Energy Consumption Survey (RECS).

Figure 3. Propane Surveys and Data Publications

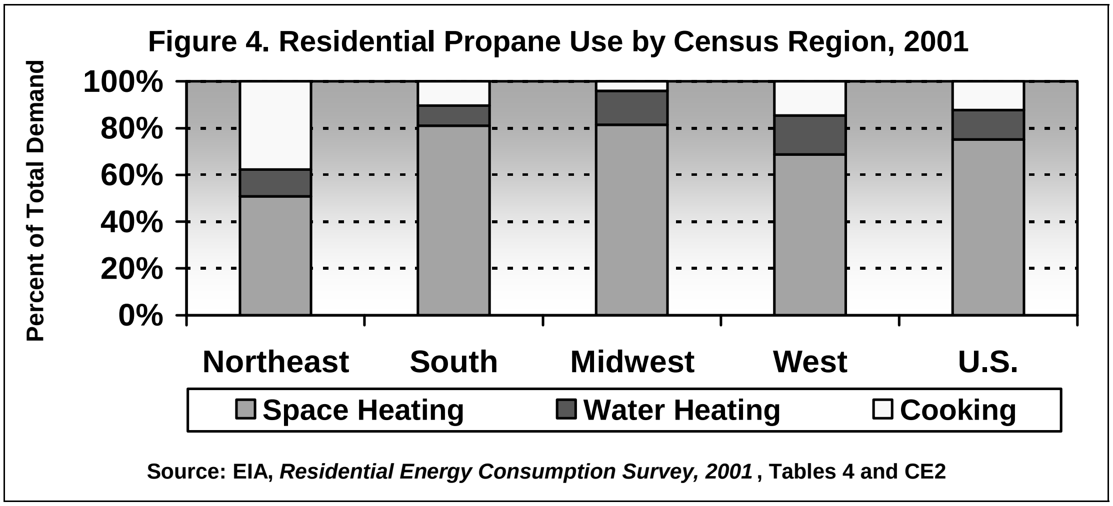


The PSM includes volume data from surveys of primary suppliers such as refineries, natural gas plants, pipelines, and bulk terminals. The PMM includes volume and price data from the primary suppliers as well as other wholesale and retail suppliers. Because PSM surveys do not classify products by end use it is not possible to produce a complete regional supply and demand balance for residential propane. A U.S. supply-demand balance for propane is produced separately in the Short-Term Energy Outlook model.

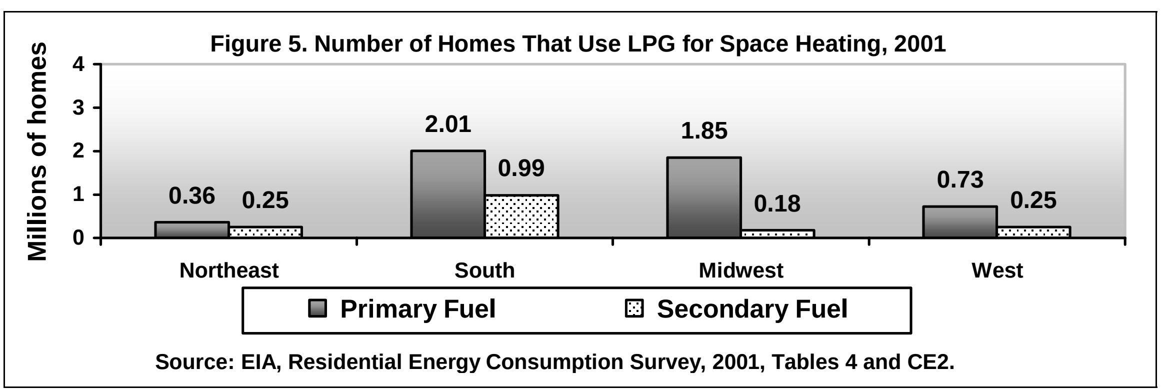
2. Residential Propane Demand

A. Introduction

Propane has three primary uses in the residential sector: space heating, water heating, and cooking. Space heating makes up about 75% of total residential propane demand while the balance of demand is split between water heating and cooking (Figure 4).

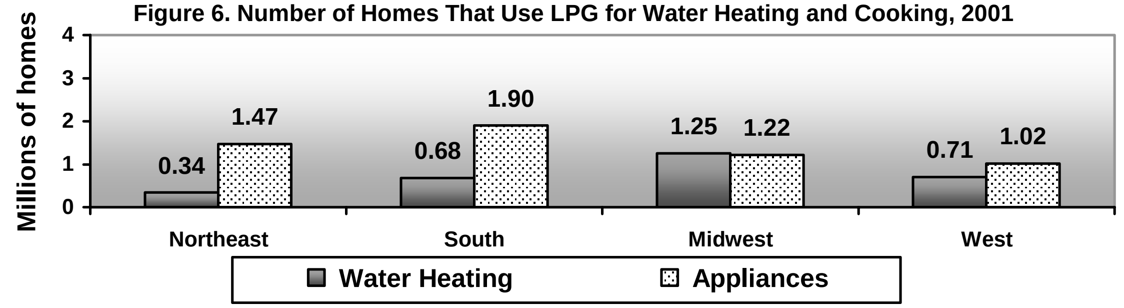


Propane has the largest share of the space heating fuel market in the Midwest with 2 million homes representing about 7.2 percent of all homes in the region using propane as their primary space heating fuel and an additional 1 million that use propane as a secondary fuel (Figure 5). While more homes in the South use propane as their primary fuel for space heating, the market share is smaller (5.2%) than in the Midwest because of the greater number of homes. The smallest market share is in the Northeast where only 0.36 million, or 1.8% of homes, use propane as their primary space heating fuel.



The number of homes that use propane for water heating and cooking (appliances) is generally less than the number with LPG space heating (Figure 6). The notable exception is the Northeast where propane is used by more homes in cooking.

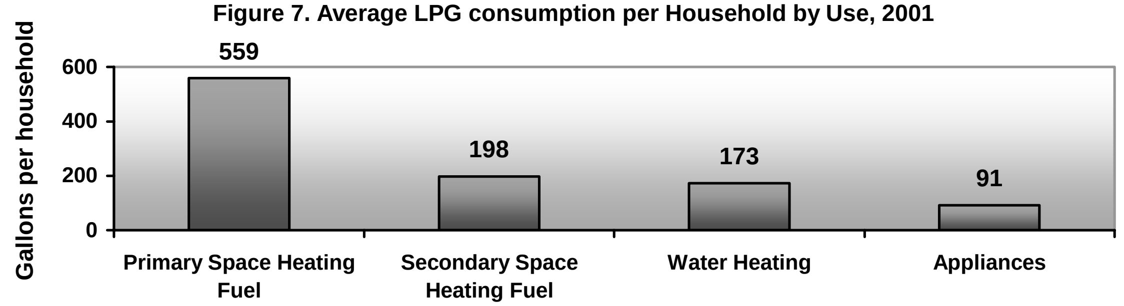
Figure 6. Number of Homes That Use LPG for Water Heating and Cooking, 2001



Source: EIA, Residential Energy Consumption Survey, 2001, Tables 4 and CE2.

LPG consumption per household is greatest for space heating followed by water heating and then cooking (Figure 7).

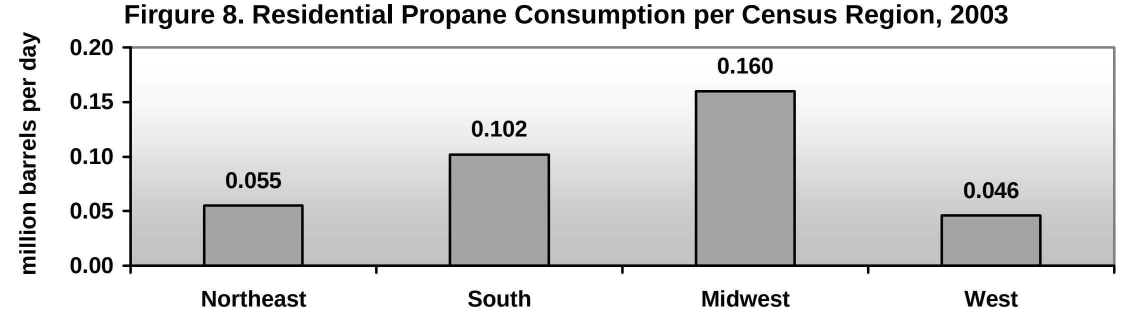
Figure 7. Average LPG consumption per Household by Use, 2001



Source: EIA, Residential Energy Consumption Survey, 2001, Tables 4 and CE2.

Average total annual average residential sector propane demand is greatest in the Midwest because of the greater number of homes using LPG fuel for space heating and colder weather (Figure 8).

Firgure 8. Residential Propane Consumption per Census Region, 2003



Source: Estimates from EIA. Short-Term Energy Model

B. Regional Demand Equations

The Regional Short-Term Energy Model for residential propane includes residential sector propane demand for the four census regions. Estimates of regional residential propane demand are used to weight regional propane prices to calculate an average U.S. residential propane price.

The census region residential propane demand equations include the following four groups of explanatory variables:

Residential Propane Price	The average real residential propane price in the census region.
Weather	Census division heating degree day deviations from normal weighted to the census region level based on the number of homes in each census division that use LPG as their primary space heating fuel.
Number of Homes	The number of homes in each census region that use LPG as their primary space heating fuel.
Dummy Variables	Dummy variables are included to capture the seasonality in propane consumption and to eliminate the effects of certain events that are considered outliers in the data series.

1. Residential Propane Price

The average real census region residential propane price (nominal price divided by the consumer price index) is included to capture the expected small negative elasticity of demand with respect to price.

Because propane demand is highly seasonal we include two price variables, one for November through March and one for April through October. A given change in price is expected to have a larger affect on demand in the winter than in the summer. For example, the Northeast region propane demand model includes the following two independent variables:

(prrcune / cicpius) * (nov+dec+jan+feb+mar)
(prrcune / cicpius) * (apr+may+jun+jul+aug+sep+oct)

where,
prrcune = Northeast residential propane price

cicpius = Consumer price index

The regression results confirm that negative relationships between demand and price are present in all four census regions and the price effect is larger in the winter than in the summer (Table 1). Residential demand declines as the real residential propane price in each census region rises with all other variables held constant.

We can calculate an approximate price elasticity of demand based on the estimated regression coefficients in the residential price equations using the average residential demands and prices over the regression equation estimation period (Jan. 1995 – Dec. 2004), which are reported in Table 1. For example, the average winter residential demand and price for the Northeast region were 67 thousand barrels per day and 132.4 cents per gallon, respectively. An estimated price coefficient of -0.000288 (with propane demand in millions of barrels per day) implies a 10 percent increase in price, from 132.4 to 145.64 cents per gallon, reduces residential demand from 67.0 to 63.2 thousand barrels per day, or 5.7 percent. Thus, the price elasticity of demand is -0.57 (the 5.7 percent increase in demand divided by the 10 percent increase in price).

Table 1. Calculated elasticities of residential propane demand with respect to residential propane price by census region.

	Northeast	South	Midwest	West
Winter (November – March):				
Average demand, million bpd	0.067	0.171	0.220	0.059
Average price, cents/gal	132.4	120.3	91.9	115.1
Estimated coefficient	-0.000288	-0.001154	-0.000537	-0.000394
Calculated price elasticity	-0.57	-0.81	-0.22	-0.77
Summer (April – October):				
Average demand, million bpd	0.029	0.058	0.080	0.030
Average price, cents/gal	135.0	112.1	85.7	105.8
Estimated coefficient	-0.000140*	+0.0000087*	-0.000266*	-0.000306
Calculated price elasticity	-0.65	+0.02	-0.28	-1.08

Elasticities are calculated based on simple demand and price averages over the regression equation estimation period (Jan. 1995 – Dec. 2004).
* Estimated coefficient not statistically significant at the 90% confidence interval.

2. Weather

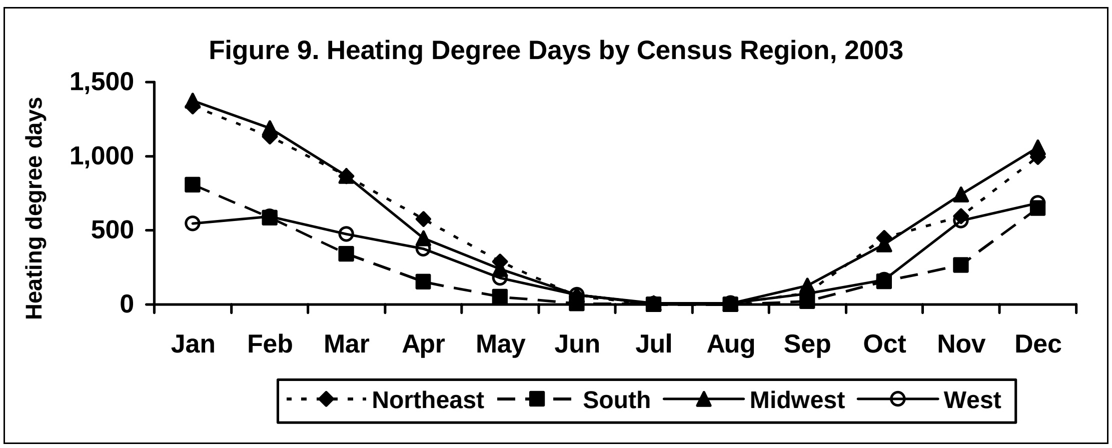
Propane demand in the residential sector is highly seasonal because of the weather-related space heating demand. Fuel demand for space heating rises during the winter months and falls during the spring and summer.

Heating degree days is a useful indicator of the energy required for space heating. When the daily mean temperature is below 65 degrees F, most buildings require heat to maintain inside temperatures of 70 degrees. Heating degree days are calculated by subtracting the daily mean temperature (the average of the day's high and low temperatures) from 65 degrees F. Each degree below 65 degrees is one degree day. The daily totals are summed for each month.

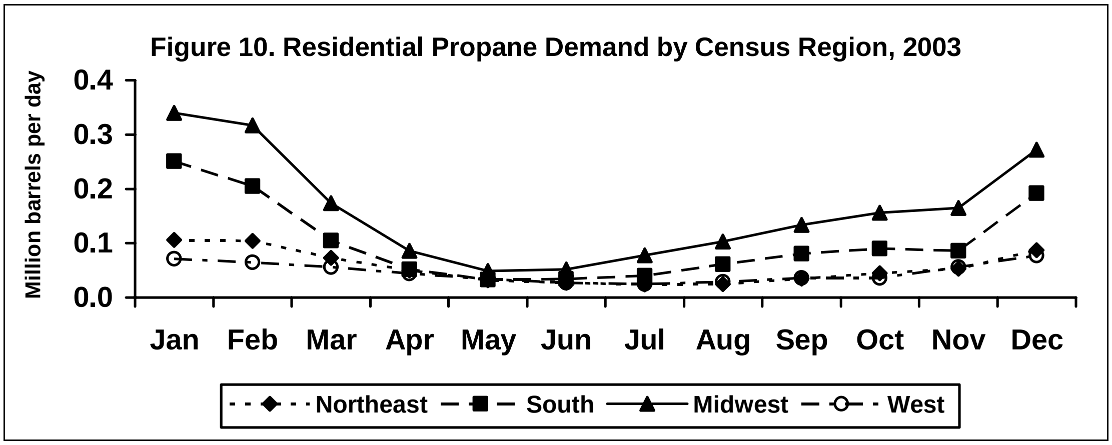
Heating degree days for each census region are calculated by weighting the heating degree days for each census district within the region by the number of homes with LPG as the primary space heating fuel in each district. An example calculation of the LPG-weighted heating degree days for the Northeast region is shown in Table 2. Heating degrees days by month for each census region are shown in Figure 9.

Table 2. Calculation of Northeast Census Region Heating Degree Days, January 2004.

Census District	Heating degree days		Number of homes with LPG heat		
New England	1,474	x	0.138	=	203.412
Middle Atlantic	1,348	x	0.226	=	306.648
			0.364		510.060
Divided by total number of homes				÷	0.364
Northeast census region heating degree days				=	1,401



Because space heating represents the largest share of residential propane demand, total residential propane demand is also strongly seasonal as shown in Figure 10. The Midwest region with more homes using LPG for space heating exhibited the greatest seasonality in demand in 2003 with monthly demand ranging from a low of 49 thousand barrels per day in May to a high of 340 thousand barrels per day in January.



We can also illustrate the cold weather impact on demand by comparing per household demand with heating degree days as shown in Figures 11A through 11D. One additional heating degree day in the South, Midwest, and West census regions increases per household daily demand between 0.0027 barrels (0.11 gallons) to 0.0036 barrels (0.15 gallons). The North census region shows a larger response of 0.0055 barrels (0.23 gallons) per household per day.

Figure 11A. Northeast Residential Propane Demand vs Weather, January 1994 - December 2003

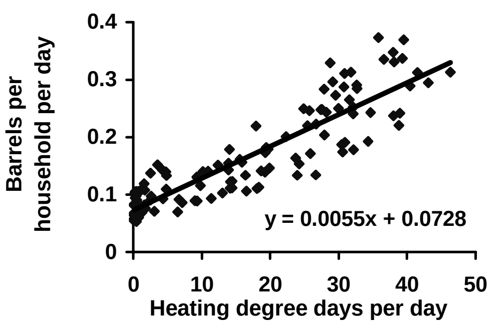


Figure 11B. South Residential Propane Demand vs Weather, January 1994 - December 2003

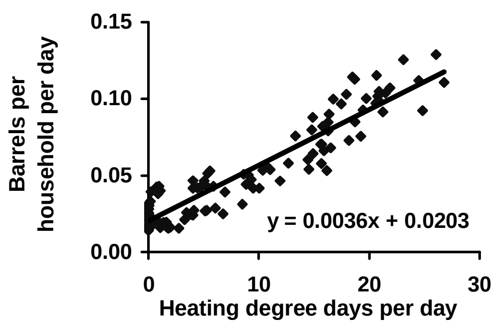


Figure 11C. Midwest Residential Propane Demand vs Weather, January 1994 - December 2003

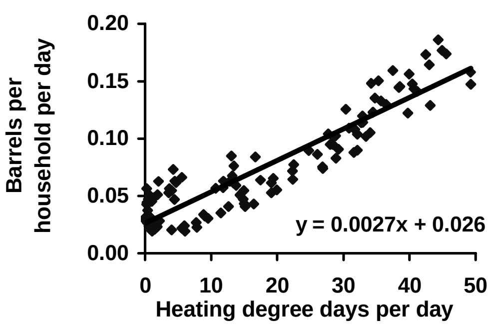
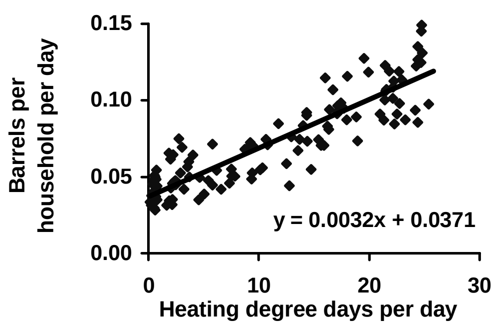


Figure 11D. West Residential Propane Demand vs Weather, January 1994 - December 2003



The residential propane demand equations include heating degree day deviations from normal for both the current month and the previous month. For example, some of the residential demand impact of a cold January may not show up until February as residences get their propane tanks refilled. The regression results indicate that in the Northeast, South and Midwest regions about two-thirds of the demand impact occurs immediately while over 90 percent of the cold weather impact on demand in the West occurs during the first month.

A rule-of-thumb is that a 10 percent increase in heating degree days increases fuel required for space heating by 10 percent. The effects of a 10 percent increase in heating degree days for 2005 on residential propane demand based on the estimated regression equations are reported in Table 3.

Table 3. Estimated effect of cold weather on residential propane demand by census region, 2005.
(percent change in residential sector demand)

	Northeast	South	Midwest	West	U.S.
Jan	7.6 %	9.7 %	11.6 %	7.4 %	10.0 %
Feb	7.9 %	10.0 %	12.8 %	7.7 %	10.7%
Mar	9.3 %	12.6 %	15.4 %	7.1 %	12.5 %
Apr	9.2 %	13.0 %	17.3 %	7.7 %	13.1 %
May	7.2 %	8.1 %	15.3 %	6.3 %	10.1 %
Jun	2.8 %	1.9 %	5.7 %	3.4 %	3.7 %
Jul	0.7 %	0.2 %	1.2 %	1.5 %	0.9 %
Aug	0.3 %	0.1 %	0.7 %	0.7 %	0.5 %
Sep	1.2 %	0.6 %	2.1 %	1.3 %	1.4 %
Oct	3.8 %	3.7 %	6.2 %	3.7 %	4.8 %
Nov	6.3 %	7.9 %	10.5 %	6.0 %	8.5 %
Dec	6.5 %	8.3 %	11.0 %	6.6 %	9.0 %
Average	6.1 %	7.7 %	10.2 %	5.6 %	8.2 %

Alternative cold weather scenario assumes 10% more heating degree days in each census region beginning January 2005.

The results in Table 3 are consistent with the characteristics of the residential propane market. Cold weather primarily affects propane demand for space heating during the winter. The Midwest with the largest share of propane demand going to space heating and the coldest winters should experience the greatest winter weather impact. The smaller shares of space heating (Northeast and West) and milder winters (South and West) reduce the total residential propane demand response to colder weather.

3. Number of Homes with LPG Heat

Propane demand is expected to be positively related to the number of the homes that use LPGs as the main heating fuel. The EIA Residential Energy Consumption Survey

(RECS) reports the number of homes and volume of LPG consumed by census division for the following categories of use:

- Any use
- Space heating primary fuel
- Space heating secondary fuel
- Water heating
- Appliances (e.g., cooking)

The largest volume of use is as the primary fuel for space heating, which represents about two-thirds of total residential propane demand in the Nation (detailed tables with the number of homes and LPG consumption by census region are available in Appendix A). LPG use as the secondary fuel for space heating represents about 8 percent of total residential demand, with the balance of residential demand split between water heating and appliances.

The regional propane residential demand regression equations include the number of homes that use LPG as the primary space heating fuel. The total number of homes with LPG as the primary space heating fuel in each census region is calculated by adding the number of homes in each corresponding census division. For example, the Northeast census region includes the Middle Atlantic and New England census divisions:

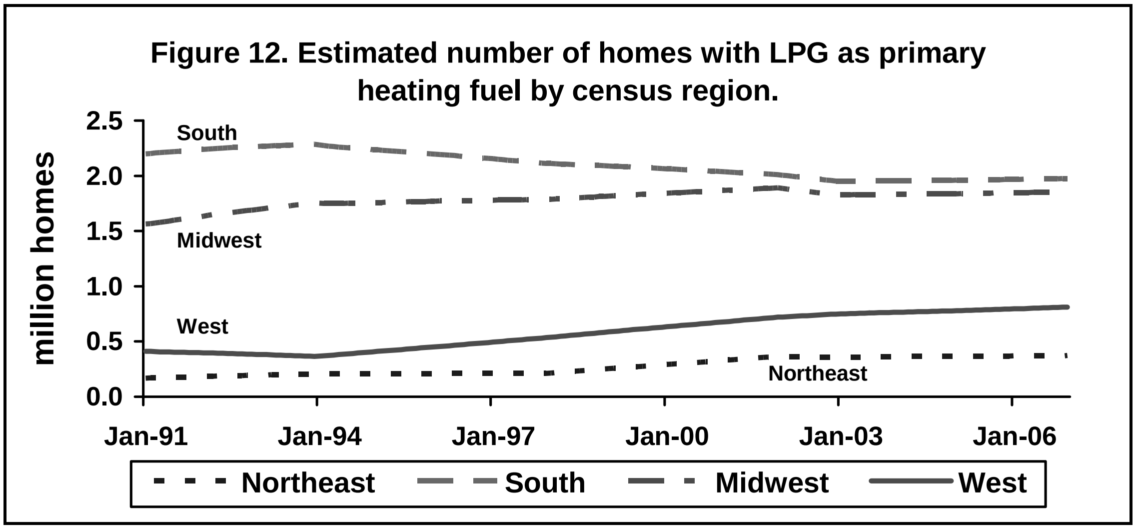
Total number of homes in Northeast census region with LPG space heating = qhlpghrecs_mac + qhlpghrecs_nec

where,

ghlpghrecs_mac = RECS estimate of homes using LPG as the primary heating fuel in the Middle Atlantic census division

qhlpghrecs_nec = RECS estimate of homes using LPG as the primary heating fuel in the New England census division

The RECS surveys are conducted every four years (1989, 1993, 1997, and 2001). A monthly time series is created by linear interpolation between the RECS survey points (Figure 12). A forecast of the number of homes is created by multiplying the share of total homes reported in the 2001 RECS survey by regional population forecasts published by the U.S. Census Bureau.



Sources: Linear interpolation and extrapolation of EIA Residential Energy Consumption Survey data.

The relationship between propane demand and the number of houses with LPG as the main space heating fuel should be seasonal. In other words, a doubling of homes using propane for space heating will have a much larger effect on demand in January than in July. Because of this expected seasonal relationship the number of homes with LPG heat is separated into two seasons: one series includes the number of homes in November through March (0 otherwise) and a second series includes the number of homes in April through October (0 otherwise). For example, the Northeast region propane demand model includes the following two independent variables:

(qhlpghrecs_mac + qhlpghrecs_nec) * (nov+dec+jan+feb+mar)
(qhlpghrecs_mac + qhlpghrecs_nec) * (apr+may+jun+jul+aug+sep+oct)

We can see the effect of a change in the number of homes on propane demand by comparing an estimated average seasonal demand per house for space heating derived from the 2001 RECS with the estimated regression coefficients for the number of houses per season in Table 4. For example, the estimated coefficient on the number of houses with LPG as the primary space heating fuel for the Northeast implies that each additional house will increase winter propane consumption by about 0.024 barrels per day per house, which is less than the estimated average 0.067 barrels per house per day from RECS.

Table 4. Residential propane demand and number of houses with LPG heat

	Estimated average LPG demand as primary space heating fuel per house from RECS, (barrels per house per day)	**Estimated coefficient on number of houses with LPG as primary space heating fuel, (barrels per house per day)**
Northeast:		
April - October	0.029	0.006*

November - March	0.067	0.024
South:		
April - October	0.015	0.041*
November - March	0.046	0.123
Midwest:		
April - October	0.026	0.098
November - March	0.071	0.012*
West:		
April - October	0.024	0.014
November - March	0.049	0.042

Notes: Not statistically significant at the 90% confidence level.
Estimated average LPG demand as primary space heating fuel based on the 2001 Residential Energy Consumption Survey (RECS) average household LPG demand with a correction for seasonality derived from 5-year averages (1998-2003) of total LPG residential demand. For example, estimated winter demand = 2001 RECS average LPG space heating demand per household x average winter total LPG demand / average annual total LPG demand.

The regression coefficients are roughly consistent with the estimated average seasonal space-heating demand per house except in the Midwest. There are two primary characteristics of the number of homes with LPG heat data series that reduces their efficiency as explanatory variables. The first problem is that the Residential Energy Consumption Survey only occurs every four years. The monthly historical household data series used in the regional propane model are generated by simple linear interpolation between surveys.

The second problem with RECS household data for LPGs is that the share of total households with LPG heat is small. The 95% confidence interval around the estimated number of homes in a census region with LPG space heating ranges from plus or minus 39 percent (South) to 50 percent (Northeast and West). This combination of low frequency and low precision of measurement will significantly affect the reliability of the estimated regression model coefficients.

4. Dummy Variables

Dummy variables are included to reflect the seasonality in propane consumption not captured by seasonality in prices and to eliminate the effects of certain events that are considered outliers in the data series.

First, we have dummy variables for each individual month except December. For example, JAN equals 1 for every January in the time series and is equal to 0 in every other month. These individual monthly dummy variables are intended to capture normal demand seasonality as deviations from December demand. In other words, if the coefficient for JAN is 0.05, then demand in January is expected to be 50,000 barrels per day higher than in December. The regression results for the monthly dummy variables generally reveal lower demand in the summer with demand peaking in January.

The second group of dummy variables control for nonrecurring events. The EIA monthly residential propane demand survey covers only a sample rather than universe of all retail suppliers. Every few years the sample is rebased, which can lead to shifts in demand in certain States. The most significant shift appears to have occurred recently in the Northeast, South, and West census regions. This apparent shift is captured by two dummy variables that account for a demand shift in the coldest winter months and all other months separately:

(D0212 + D03on) * (dec+jan+feb)	= 1, if December 2002, or December, January, or February in 2003 and later years, = 0, otherwise
D03on * (mar+apr+…+oct+nov)	= 1, if March through November in 2003 and later years, = 0, otherwise

4. Propane Prices

A. Introduction

Residential propane prices are highly variable within and across regions (Figures 13A – 13D). In the Midwest, South, and Northeast regions residential propane prices are generally directly related to consumption. Prices are lowest in the Midwest where total demand is highest and highest in the Northeast where demand is the lowest. Other market factors also influence the regional differences such as transportation costs from supply sources, as well as inventory levels, weather, and demand trends in each region in a given year.

Figure 13A. Northeast Residential Propane Prices ex Taxes, 2003

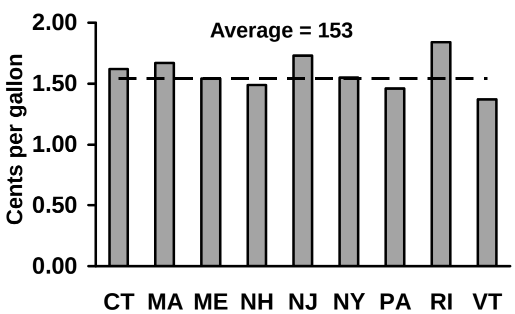


Figure 13B. South Residential Propane Prices ex Taxes, 2003

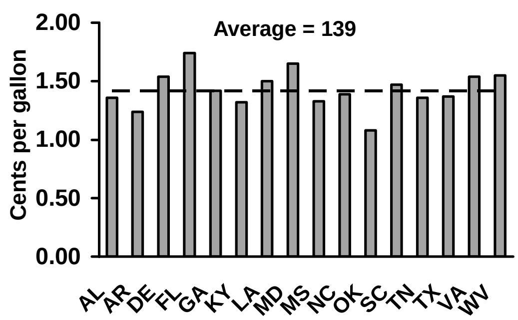


Figure 13C. Midwest Residential Propane Prices ex Taxes, 2003

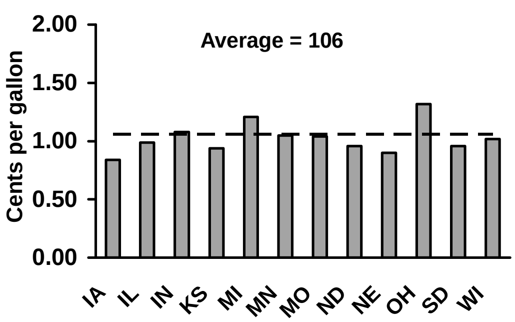
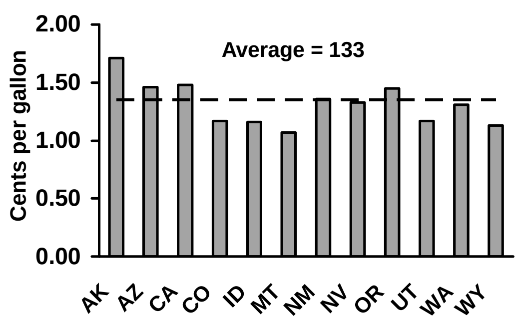


Figure 13D. West Residential Propane Prices ex Taxes, 2003



The propane price model begins with an estimate of the average U.S. wholesale price to the petrochemical sector. This wholesale price is used as a proxy for the wholesale price to each regional residential sector. Residential propane prices excluding State taxes are modeled as a function of wholesale prices and other variables that may affect the markup of retail prices over wholesale prices.

B. Wholesale Price to Petrochemical Sector

There are three primary measures of wholesale prices that we can use:

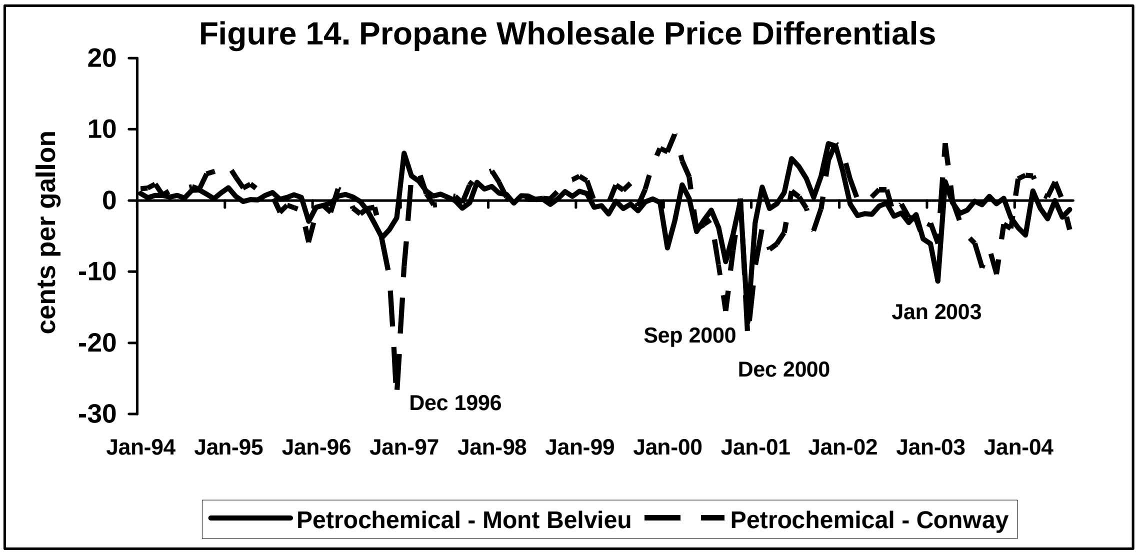
- spot price at Mont Belvieu, Texas,
- spot price at Conway, Kansas, and
- wholesale price to the petrochemical sector.

Mont Belvieu is the center of natural gas liquids fractionation and storage on the Gulf Coast. Located between Houston and Beaumont, the facilities at Mont Belvieu include a number of fractionating plants and pipeline facilities, situated on top of a natural salt dome structure containing millions of barrels of cavern storage for gas liquids. This facility serves the petrochemical industry of the Gulf Coast and is connected to the major pipelines that serve the Southeast, lower Midwest, and East Coast markets.

Conway, Kansas, is also a gas liquids storage and transportation hub, consisting of fractionation and pipeline installations adjacent to cavern storage facilities. Product sold at Conway may be shipped by pipeline throughout the Midwest, or loaded into rail cars for shipment anywhere in the United States. Conway sales dominate the agricultural demand sector as well as serving the large Midwest residential demand region.

About 41 percent of the U.S. propane supply is used in the petrochemical industry. Most of this propane is used as feedstock for about 40 olefin plants, which produce building block chemicals (ethylene, propylene, butylenes, butadiene, and benzene) from which most petrochemicals are derived. Olefins plants and propane demand as a petrochemical feedstock are concentrated in the U.S. Gulf Coast States.

The wholesale price to the petrochemical sector, the Mont Belvieu and Conway spot prices are generally closely related with the petrochemical wholesale price averaging about 0.5 cent per gallon below the spot prices (Figure 14). However, some events, particularly very cold weather such as in December 2000 and January 2003, can lead to increases in the spot prices that are not matched by the wholesale price to the petrochemical sector. Unexpected high demand in the Midwest in the fourth quarter 1996 from crop drying and cold weather pulled Midwest stocks down to two-thirds normal level and boosted Conway spot prices.



The wholesale price to the petrochemical sector was selected for the Regional Short-Term Energy Model because it a more valid representation of an average monthly price where it is a volume-weighted average derived from EIA price and volume surveys while the spot prices are simple daily averages.

The wholesale price to the petrochemical sector also provides the best model fit in all retail residential price equations. Table 5 compares the South and Midwest regions' residential price regression equation coefficients for wholesale price and the equation goodness of fit for the three wholesale price alternatives.

Table 5. South and Midwest residential propane price regression equation fit with Alternative wholesale price variables.

	Wholesale Price Variable		
	Wholesale Price to Petrochemical Sector	Conway Spot Price	Month Belvieu Spot Price
South Census Region			
Estimated coefficient for current month wholesale price variable:			
Coefficient value	0.753	0.553	0.493
Standard error	0.064	0.063	0.058
Estimated coefficient for prior month wholesale price variable:			
Coefficient value	0.301	0.482	0.572
Standard error	0.066	0.060	0.060
Equation R-squared	0.9891	0.9834	0.9867
Midwest Census Region			
Estimated coefficient for current month wholesale price variable:			
Coefficient value	0.411	0.413	0.356
Standard error	0.048	0.039	0.042
Estimated coefficient for prior month wholesale price variable:			

Coefficient value	0.612	0.611	0.668
Standard error	0.051	0.039	0.044
Equation R-squared	0.9926	0.9913	0.9909

The propane wholesale price to the petrochemical sector is modeled as a function of the following variables:

Crude Oil Price	Average acquisition cost of crude oil to U.S. refineries.
Natural Gas Price	Spot price of natural gas at Henry Hub, LA.
Wholesale Propane – Crude Oil Price Differential	Prior month difference between the propane wholesale price to the petrochemical sector and the average acquisition cost of crude oil to U.S. refineries.
Wholesale Propane – Natural Gas Price Differential	Prior month difference between the propane wholesale price to the petrochemical sector and the spot price of natural gas at Henry Hub, LA.
U.S. Inventories	Deviation in prior month ending U.S. total primary stocks from the prior four-year average for that month.
Industrial Production Index	Manufacturing, Nondurables, Chemicals and Products (SIC-28)
Dummy Variables	Dummy variables are included to capture seasonality and to eliminate the effects of certain events that are considered outliers in the data series.

1. Crude Oil and Natural Gas Prices

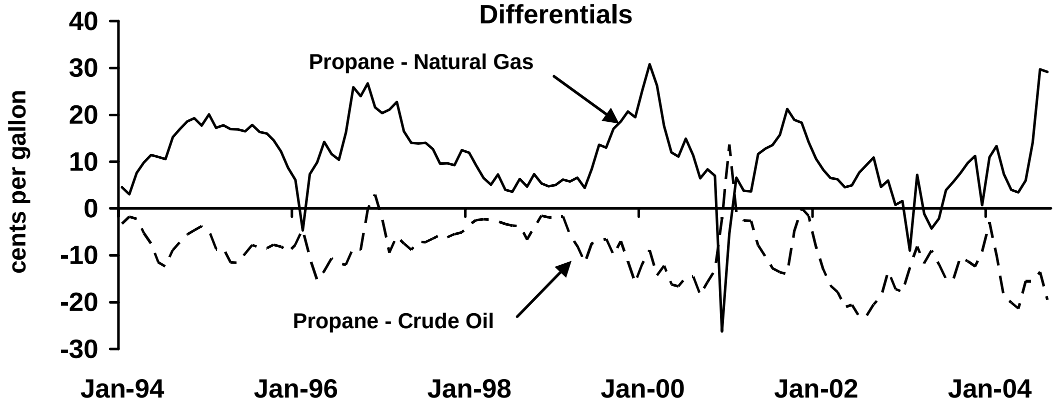
Since propane is a byproduct of crude oil refining and is recovered from wet natural gas we assume wholesale propane prices are related to both crude oil and natural gas prices. The wholesale price of propane is also related to oil and gas because the demand for propane as an olefins plant feedstock depends on its economics relative to the other feedstocks. Propane competes with ethane, normal butane, naphtha, and gas oil as a feedstock in olefins plans. Thus, other feedstocks for the petrochemical market derived from oil and gas provide some buffer to winter weather-related propane demand shocks.

There are limits to swings in the feedstock mix that olefins plants can handle given equipment, process, and market constraints. For example, from August 1996 to December 1996, when wholesale propane prices increased by 21.5 cents per gallon (from 36.9 to 58.4 cents per gallon), propane feed to ethylene crackers dropped from 350 thousand barrels per day to 217 thousand barrels per day, but overall feedstock throughput hardly fell. Since ethane and naphtha prices did not rise as dramatically these inputs were increased, offsetting the drop in propane (EIA, *An Analysis of U.S. Propane Markets Winter 1996-97*, SR/OOG/97-01, Washington, DC, June 1997, p. 10)

2. Propane - Crude Oil and Natural Gas Price Differentials

The wholesale propane price does not react completely to changes in either natural gas or crude oil prices. Figure 15 shows that when the price of natural gas increases relative to the price of crude oil the propane-to-natural gas price differential falls while the propane-to-crude oil price differential rises.

Figure 15. Wholesale Propane - Natural Gas and Crude Oil Price Differentials



Notes: Natural gas price at Henry Hub in $/million Btu divided by 0.1027 to convert to propane equivalent price. Crude oil price is refinery average acquisition cost.

The propane-to-natural gas price differential is calculated based on the Henry Hub natural gas spot price. The Henry Hub spot price in dollars per million Btu is converted to a propane-equivalent value in cents per gallon by multiplying by the approximate propane heating value of 91,000 Btu per gallon (EIA, *Annual Energy Review*, Appendix A).

The propane-to-crude oil price differential is calculated based on the refiner average crude oil acquisition cost. The crude oil price in dollars per barrel is divided by 42 to convert it to a per gallon basis.

3. Inventories

The beginning of month (end of prior month) total U.S. inventory as a deviation from the prior four year average for that month is included as a right-hand side variable. Higher than historical average U.S. inventory levels are expected to lower the wholesale propane price. The estimated regression equation coefficient is consistent with this expectation. Wholesale propane prices are from 1.0 to 2.6 cents per gallon higher (the greatest price impact occurs during the winter months) when inventories are 1 standard deviation lower than the last five year average (1999 – 2003).

4. Industrial Production Index

The industrial production index for the chemical sector (SIC-28) is included to capture changes in demand for propane as a feedstock. The estimated coefficient is positive as expected. An increase in the chemical industry production index raises the wholesale price of propane.

5. Dummy Variables

Dummy variables are included to reflect the seasonality in wholesale propane prices not captured by seasonality in the other variables and to eliminate the effects of certain events that are considered outliers in the data series.

First, we have dummy variables for each individual month except December. For example, JAN equals 1 for every January in the time series and is equal to 0 in every other month. These individual monthly dummy variables are intended to capture normal wholesale price seasonality as deviations from the December price. In other words, if the coefficient for JAN is 1.00, then the wholesale price in January is expected to be 1.0 cent per gallon higher than in December with all other variables held constant.

The regression results for the monthly dummy variables conform to expectations with the wholesale price lowest in April and peaks at the start of the heating season in November. The observed seasonality in price provides an incentive for firms to build and hold propane inventories during the summer months for delivery during the winter heating season.

The second group of dummy variables control for nonrecurring events that are considered outliers in the data series. These dummy variables shown in Table 6 identify months when the wholesale price was significantly higher or lower than expected.

Table 6. Wholesale petrochemical price equation dummy variables.

Variable	Description	Estimated Coefficient	Explanation
d9611 + d9612	Nov + Dec, 1998	6.8	
d0101	Jan 2001	14.7	Cold Dec and Jan with natural gas price spike
d0303	Mar 2003	6.7	Cold Jan and Feb with natural gas price spike
d0401	Jan 2004	8.8	Cold Jan and Feb with natural gas price spike

C. Residential Propane Prices Before State Taxes

The Regional Short-Term Energy Model for residential propane includes residential sector propane prices excluding State taxes for the four census regions. The census region residential propane price equations include the following explanatory variables:

The Regional Short-Term Energy Model for residential propane includes residential sector propane retail prices for the four census regions. The difference between the census region residential propane retail price and the wholesale price to the petrochemical sector is estimated as a function of the following explanatory variables plus a first-order autoregressive error correction term:

Wholesale Propane Price to Petrochemical Sector Change	The change in the current month wholesale propane price from the previous month.
Weather	Census division heating degree day deviations from normal weighted to the census region level using the number of homes in each census division that use LPG as their primary space heating fuel.
Regional Stocks	Deviation in prior end-of-month Petroleum Administration for Defense District (PADD) stocks from the prior four-year average for that month.
Dummy Variables	Dummy variables are included to capture the seasonality in propane prices and to eliminate the effects of certain events that are considered outliers in the data series.

1. Wholesale Price to Petrochemical Sector Change

The residential heating oil price is directly related to the wholesale price. A change in the wholesale price is expected to feed forward to residential prices, possibly with a short lag. Including the difference in the current and prior-month wholesale distillate price as an explanatory variable allows for some delay in the price pass through.

The structure of the estimated regression equation:

$$PRRCUxx(t) – PRPCUUS(t) = a0 + a1 * [PRPCUUS(t) – PRPCUUS(t-1)]...$$

where, PRRCUxx(t) = residential propane retail price in region xx in month t
PRPCUUS(t) = wholesale propane price in month t

a0, a1 = estimated regression coefficients

is equivalent to the following equation:

PRRCUxx(t) = a0 + (1 + a1) * PRPCUUS (t) – a1 * PRPCUUS (t-1)...

with the coefficients on the current and lagged wholesale prices constrained to add to 1.0.

The estimated values of the *a1* coefficients for the different regional equations suggests that from 52 percent (West) to 75 percent (Midwest) of a change in the wholesale price shows up in the current month residential price with the remainder in the following month.

2. Weather

Regional heating degree day deviations from normal are included to capture the impact of cold weather on retail prices. Surprisingly the estimated coefficients on the regional weather variables are all negative, although weather is statistically significant only in the South census region. Colder-than-normal weather lowers the residential propane price with all other variables held constant. The impact of the negative weather coefficient is small. If heating degree days are 10% greater than normal, the retail price effect is at most – 1.0 cent per gallon in the South and -0.25 cent per gallon in the other three census regions.

The reason for this unexpected relationship is that weather influences residential prices through the wholesale price, which is affected by weather through the price of natural gas (weather in the wholesale propane price equation was not statistically significant and was excluded). Since the sum of the retail propane price coefficients on the current and lagged wholesale propane price are slightly greater than one, a 1 cent increase in the wholesale propane price translates to a slightly larger increase in the retail price. Where the wholesale price increase is due to cold weather, the retail propane price equation negative coefficient on weather provides a slight offset to the wholesale price pass through.

3. Inventories

While total U.S. inventories are included in the wholesale propane price regression equation, regional inventory levels are included in the residential price equations. Inventories are entered as the difference in beginning-of-month stocks from the prior four year average.

Inventory data are not available by census region. Inventories by Petroleum Administration for Defense (PAD) District are used for census regions as shown below.

A more detailed description of the correspondence between census regions and PAD Districts is provided in Appendix A.

Census Region	**PAD District**
Northeast	1
South	1
Midwest	2
West	5

The estimated coefficients on inventories are negative as expected but are not statistically significant. When regional stocks are 1 standard deviation lower than the average over the last five years (1999 – 2003), residential prices are less than 0.3 cents per gallon higher. Most of the impact of inventories on prices is on wholesale prices. Although the estimated coefficients are not statistically significant we leave them in the regression equations for information purposes and their impact may change as the equations may be revised.

4. Dummy Variables

Dummy variables are again included to reflect the seasonality in residential propane prices (or the markup over the wholesale price) not captured by seasonality in the wholesale price and inventory variables and to eliminate the effects of certain events that are considered outliers in the data series.

The regression results for the monthly dummy variables conform to expectations with the residential price lowest at the end of summer and peaking during the winter. The observed seasonality in price reflects the seasonality in demand and provides an incentive for firms to build and hold propane inventories during the summer months for delivery during the winter heating season.

The second group of dummy variables control for nonrecurring events that are considered outliers in the data series. These dummy variables shown in table 6 identify months when the wholesale price was significantly higher or lower than expected.

Table 8. Residential price equation dummy variables.

		Estimated Coefficients				
Variable	Description	Northeast	South	Midwest	West	Explanation
d9702	Feb 1997	n.a.	n.a.	-10.4	n.a.	
d9702 + d9703	Feb + Mar 1997	n.a.	n.a.	n.a.	-8.3	
d0009	Sep 2000	n.a.	n.a.	7.5	n.a.	
d0012 + d0101	Dec 2000 + Jan 2001	n.a.	16.6	9.4	10.8	Coldest December in last 15 years

d0106	Jun 2001	n.a.	n.a.	-7.0	n.a.	
d0203	Mar 2002	n.a.	n.a.	n.a.	-8.1	
d0303	Mar 2003	14.5	11.9	6.1	10.7	Cold Jan and Feb with natural gas price spike

D. Residential Propane Prices After State Taxes

The Regional Short-Term Energy Model for residential propane includes residential sector propane prices including State taxes for the four census regions. The propane price including State taxes is calculated by multiplying each region's propane price ex tax by a regional sales tax factor. For example, the Northeast region propane price including State taxes is calculated by:

PRRCANE = PRTXUNE * PRRCUNE

where,

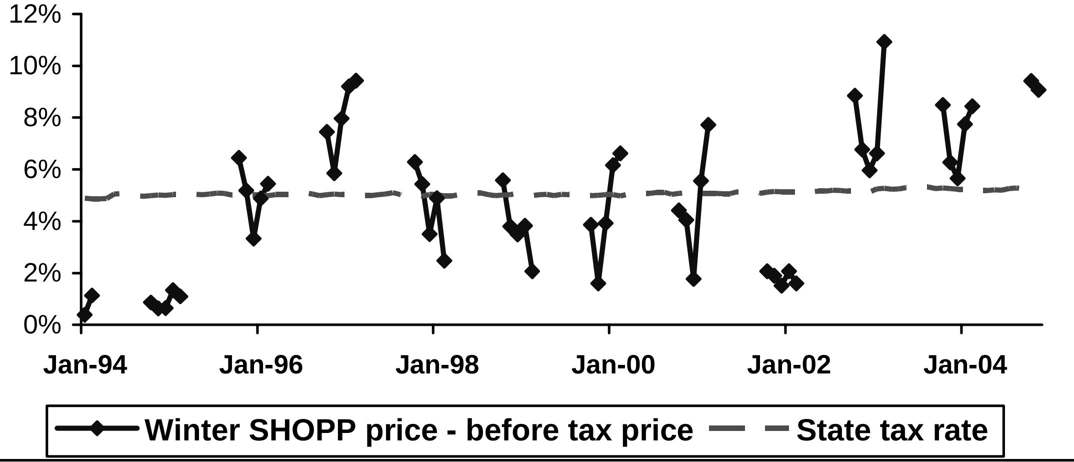
PRRCANE = Residential propane price after taxes, Northeast region
PRTXUNE = Region State sales tax factor (e.g., 1.05 = 5% tax rate)
PRRCUNE = Residential propane price before taxes, Northeast region

The regional sales tax factors used in the model are approximations of the actual average sales tax. We apply the same State tax rates used in EIA's estimation of State residential petroleum product prices including taxes published in the annual *State Expenditure and Price Reports* (http://www.eia.doe.gov/emeu/states/_price_multistate.html). The State tax rate includes the State's portion of the sales tax and excludes any local options for additional sales tax. The census region tax rate is calculated by weighting each State's tax rate by the volume of residential propane sales in that State for each month.

We can check the efficacy of this method by comparing the difference between other published after-tax residential propane prices and our before-tax price versus our estimated regional sales tax factor. EIA publishes the *State Heating Oil and Propane Program* (SHOPP) weekly survey of after-tax residential propane prices conducted by State energy offices. The SHOPP surveys are conducted only during the winter months (beginning of October through mid-March). The SHOPP propane price for the winter months from January 1994 through November 2004 was 4.85% higher on average than the before-tax price in this model. The calculated average State tax over this same period was 5.07%.

While the difference between the after-tax SHOPP price and our before-tax price is very close to the estimated regional sales tax rate, there can be large deviations in any one month (Figure 15). One fundamental difference between the two series that leads to the large variations is that the SHOPP residential price is a spot (or will-call) price while the before-tax price represents an actual price paid by households. The actual household price may be higher or lower than the spot price because many households lock in winter prices during the summer months. Consequently, during unexpected price increases during the winter, the average price actually paid by households may be significantly lower than the spot price. If spot prices fall then households could pay more. Because the objective of the Regional Short-Term Energy Model is to forecast average prices households actually pay we do not attempt to model spot residential prices. Consequently, some households may pay significantly more or less than regional prices estimated in this model not only because of price differences across States and regions but also because of the market pricing structure.

Figure 15. Propane Before- and After-Tax Price Differentials



5. Inventories

A. Introduction

Propane inventory withdrawals provide the second largest source of propane during the winter heating season. During the peak demand months of December, January, and February, propane inventories supply over 20 percent of total demand on average. Inventories are built up during the spring and summer months, and typically peak by the end of September or October and reach their lowest point in March.

Propane storage consists of three types: primary, secondary, and tertiary. Primary storage consists of refinery, gas plant, pipeline, and bulk terminal stocks. Secondary storage consists primarily of large above-ground tanks owned by propane retail distributors, while tertiary storage consists mainly of non-chemical end-users such as residential and commercial customers. Although chemical companies may hold substantial inventories of propane for their feedstock requirements, their status as an end user precludes their inventories from being counted as primary supply.

Inventory survey data are available only at the primary storage level. Propane storage facilities at the primary level are located near the major production and transportation hubs. These facilities consist of pressurized depleted mines and underground salt dome storage caverns clustered mostly in Conway, Kansas, and Mont Belvieu, Texas. Smaller storage hubs are located in New York, Ohio, Illinois, Michigan, Minnesota, and Louisiana. Primary storage also includes stocks held at refineries.

B. Regional Inventory Equations

The Regional Short-Term Energy Model for residential propane includes inventories for the five Petroleum Administration for Defense Districts (PADD). Inventory data for the census region districts are not available.

Inventories are modeled as first difference stock changes rather than as stock levels. The reason for modeling stocks as changes rather than levels is that this method can provide a smoother transition from the historical data into the forecast.

The PADD stock change equations include the following explanatory variables:

Wholesale Propane – Crude Oil Price Differential	Prior month difference between the propane wholesale price to the petrochemical sector and the average acquisition cost of crude oil to U.S. refineries.

Wholesale Propane – Natural Gas Price Differential	Prior month difference between the propane wholesale price to the petrochemical sector and the spot price of natural gas at Henry Hub, LA.
Beginning Stocks	Deviation in prior month ending U.S. total primary stocks from the prior four-year average for that month.
Weather	Census division heating degree days weighted to the census region level using the number of homes in each census division that use LPG as their primary space heating fuel.
Dummy Variables	Dummy variables are included to capture the seasonality in propane inventories and to eliminate the effects of certain events that are considered outliers in the data series.

1. Propane to Crude Oil and Natural Gas Price Differentials

An increase in the wholesale propane price relative to either the natural gas and crude oil prices is expected have a positive impact on stock changes. Stock builds should be larger than normal or stock draws smaller with a higher propane wholesale price. The higher propane price should motivate suppliers to increase output and also reduce demand by the petrochemical industry.

The propane-to-natural gas price differential is calculated based on the Henry Hub natural gas spot price. The Henry Hub spot price in dollars per million Btu is converted to a propane-equivalent value in cents per gallon by multiplying by the approximate propane heating value of 91,000 Btu per gallon (EIA, *Annual Energy Review*, Appendix A).

The propane-to-crude oil price differential is calculated based on the refiner average crude oil acquisition cost. The crude oil price in dollars per barrel is divided by 42 to convert it to a per gallon basis.

The estimated coefficients are positive as expected in all cases except for the PADD 4 propane – crude oil price differential. However, the coefficients are generally not statistically significant except for the propane - crude oil price differentials in PADDs 2 and 3.

2. Beginning Stocks

The beginning of month (end of prior month) PADD inventory as a deviation from the prior four year average for that month is included as a right-hand side variable. Higher than historical average inventory levels are expected to reduce stock builds or increase stock draws. The estimated coefficients for all PADDs were negative as expected and statistically significant.

3. Weather

The propane stock change equations include heating degree day deviations from normal for selected census divisions as shown below. A more detailed description of the correspondence between census regions and PAD Districts is provided in Appendix A.

PAD District	Census Division
1	New England, Middle Atlantic, and South Atlantic
2	East and West North Central
3	East and West South Central
4	Mountain
5	Pacific

The census division heating degree days are weighted by the number of households within each division that use propane as the primary space heating fuel to arrive at the PADD heating degree days.

Weather that is colder than normal should lead to smaller stock builds or larger stock draws because of the increase in demand. The estimated coefficients are negative as expected and statistically significant.

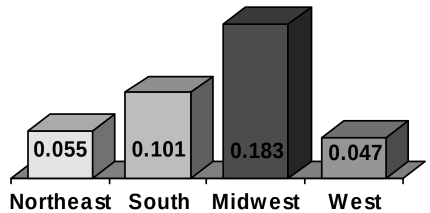
4. Dummy Variables

Dummy variables are again included to reflect the seasonality in stock changes not captured by seasonality in weather. The regression results for the monthly dummy variables conform to expectations that stock builds occur during the spring and summer months and stock draws during the winter.

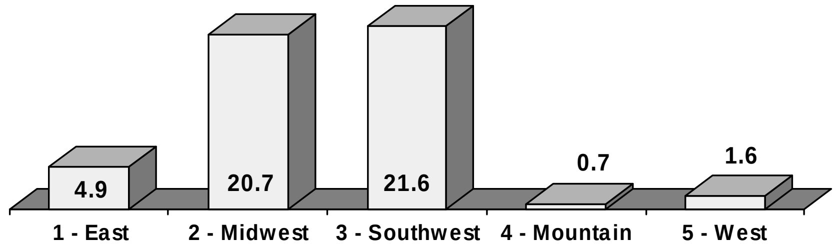
Appendix A. Detailed Tables

Appendix A1. Propane Primary Stocks, Residential Consumption, and Residential Prices by Census Region

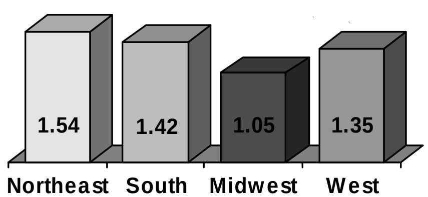
Residential Propane Consumption by Census Region, 2003 million barrels per day

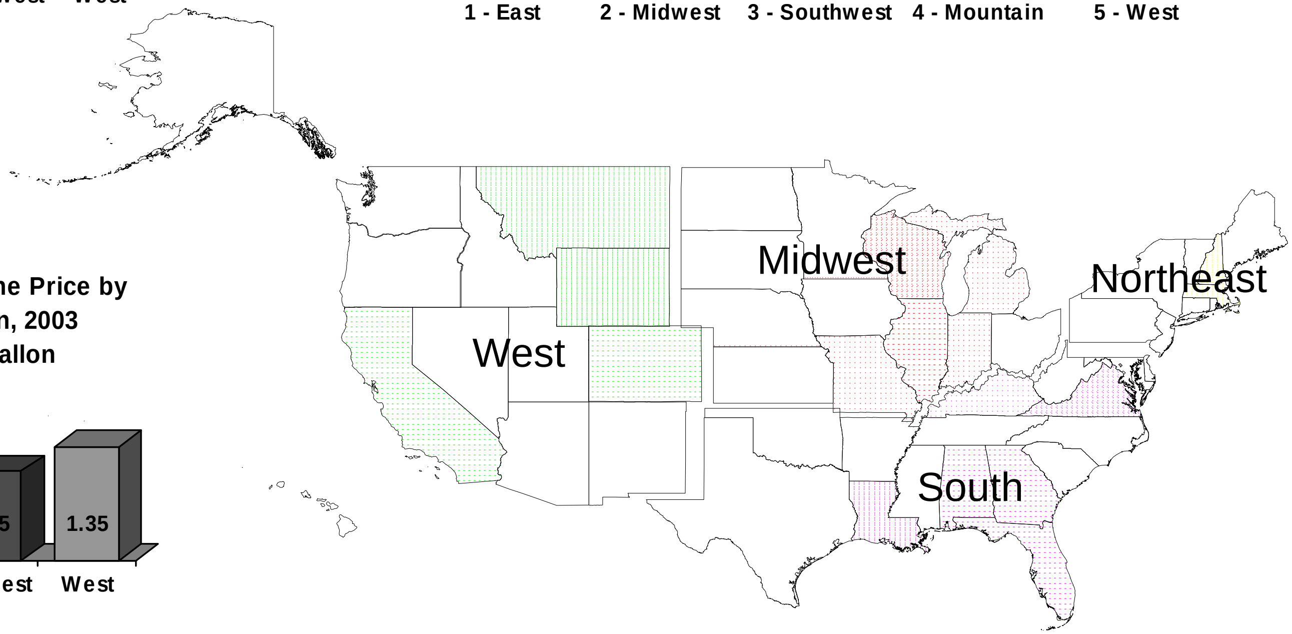


Propane Primary Stocks by PAD District, December 31, 2003, million barrels



Residential Propane Price by Census Region, 2003 dollars per gallon





Appendix A2. Correspondence Between Census Divisions and Petroleum Administration for Defense Districts.

Census Region	Census Division		Petroleum Administration for Defense District (PADD) 1	2	3	4	5	Households with LPG Space Heating, 2001 (millions) Total	Primary Fuel
Northeast	New England	CT	X					0.3	0.1
		ME	X						
		MA	X						
		NH	X						
		RI	X						
		VT	X						
	Middle Atlantic	NJ	X					0.3	0.3
		NY	X						
		PA	X						
South	South Atlantic	DE	X					1.4	0.9
		DC	X						
		FL	X						
		GA	X						
		MD	X						
		NC	X						
		SC	X						
		VA	X						
		WV	X						
	East South Central	AL			X			1.2	0.8.
		KY		X					
		MS			X				
		TN		X					
	West South Central	AK			X			0.4	0.3
		LA			X				
		OK		X					
		TX			X				
Midwest	East North Central	IL		X				1.0	0.9
		IN		X					
		MI		X					
		OH		X					
		WI		X					
	West North Central	IA		X				1.0	0.9
		KS		X					
		MN		X					
		MO		X					
		NE		X					

		ND	X					
		SD	X					
West	Mountain	AZ				X	0.5	0.4
		CO			X			
		ID			X			
		MT			X			
		NV				X		
		NM		X				
		UT			X			
		WY			X			
	Pacific	AK				X	0.5	0.4
		CA				X		
		HI				X		
		OR				X		
		WA				X		

Source households with LPG space heating: Energy Information Administration, Residential Energy Consumption Survey, 2001; Consumption and Expenditure Data Tables; Tables CE2-9c, CE2-10c, CE2-11c, and CE2-12c; accessed January 10, 2005 (http://www.eia.doe.gov/emeu/recs/).

Appendix A3. Residential Sector Use of LPG Fuel, 2001

	Census Region				
	Northeast	South	Midwest	West	U.S.
Number of homes that used LPG (millions)					
Any use (1)	1.722	3.849	2.306	1.491	9.366
Space heating (1)	0.610	2.997	2.026	0.978	6.618
Primary fuel	0.360	2.010	1.850	0.730	4.950
Secondary fuel (2)	0.250	0.987	0.176	0.248	1.668
Water Heating (1)	0.339	0.681	1.254	0.706	2.977
Appliances (1)	1.469	1.901	1.222	1.021	5.593
Total volume of LPG used (million gallons)					
Any use	563	1,301	1,607	650	4,121
Space heating	286	1,055	1,309	447	3,097
Primary fuel	247	864	1,269	385	2,767
Secondary fuel	39	191	40	62	330
Water Heating	65	111	232	108	515
Appliances	213	135	66	96	509
LPG consumption per household (gallons)					
Any use	327	338	697	436	440
Space heating	469	352	646	457	468
Primary fuel	686	430	686	528	559
Secondary fuel	156	193	226	248	198
Water Heating	192	163	185	153	173
Appliances	145	71	54	94	91

Notes:

Regions may not add to U.S. total because of rounding errors.

(1) Calculated from total volumes and volumes per household reported by the EIA Residential Energy Consumption Survey

(2) Calculated by difference between total and primary space heating.

Sources:

Energy Information Administration, Residential Energy Consumption Survey, 2001; Consumption and Expenditure Data Tables; Tables 4, CE2-9c, CE2-10c, CE2-11c, and CE2-12c; accessed January 10, 2005 (http://www.eia.doe.gov/emeu/recs/).

Appendix A4. Residential Sector Use of LPG Fuel, 1997

	Census Region				
	Northeast	**South**	**Midwest**	**West**	**U.S.**
Number of homes that used LPG (millions)					
Any use (1)	1.554	3.230	2.316	0.967	8.068
Space heating (1)	0.377	2.594	2.028	0.620	5.624
Primary fuel	0.210	2.070	1.770	0.540	4.590
Secondary fuel (2)	0.167	0.524	0.258	0.080	1.034
Water Heating (1)	0.404	1.164	1.154	0.563	3.283
Appliances (1)	1.182	1.724	1.266	0.654	4.855
Total volume of LPG used (million gallons)					
Any use	317	1,276	1,869	475	3,937
Space heating	159	921	1,458	285	2,823
Primary fuel	134	865	1,409	274	2,685
Secondary fuel	25	56	49	11	138
Water Heating	105	255	330	157	847
Appliances	52	100	81	34	267
LPG consumption per household (gallons)					
Any use	204	395	807	491	488
Space heating	422	355	719	460	502
Primary fuel	636	418	796	507	585
Secondary fuel	153	106	190	141	133
Water Heating	260	219	286	279	258
Appliances	44	58	64	52	55

Notes:

Regions may not add to U.S. total because of rounding errors.

(1) Calculated from total volumes and volumes per household reported by the EIA Residential Energy Consumption Survey

(2) Calculated by difference between total and primary space heating.

Sources:

Energy Information Administration, Residential Energy Consumption Survey, 2001; Consumption and Expenditure Data Tables; Tables 4, CE2-9c, CE2-10c, CE2-11c, and CE2-12c; accessed January 10, 2005 (http://www.eia.doe.gov/emeu/recs/).

Appendix B. Variable Definitions

Table B1. Variable Definitions

Variable Name	Units	Definition	Sources History	Forecast
APR	Integer	= 1 if April, 0 otherwise		
AUG	Integer	= 1 if August, 0 otherwise		
CICPIUS	Index	Consumer price index	BLS	DRI
D0009	Integer	= 1 if September 2000, 0 otherwise		
D0012	Integer	= 1 if December 2000, 0 otherwise		
D0101	Integer	= 1 if January 2001, 0 otherwise		
D0106	Integer	= 1 if June 2001, 0 otherwise		
D0109	Integer	= 1 if September 2001, 0 otherwise		
D0203	Integer	= 1 if March 2002, 0 otherwise		
D0212	Integer	= 1 if December 2002, 0 otherwise		
D0303	Integer	= 1 if March 2003, 0 otherwise		
D03ON	Integer	= 1 if January 2003 or later, 0 otherwise		
D0401	Integer	= 1 if January 2004, 0 otherwise		
D0409	Integer	= 1 if September 2004, 0 otherwise		
D95	Integer	= 1 if 1995 or later, 0 otherwise		
D96	Integer	= 1 if 1996, 0 otherwise		
D9611	Integer	= 1 if November 1996, 0 otherwise		
D9612	Integer	= 1 if December 1996, 0 otherwise		
D9702	Integer	= 1 if February 1997, 0 otherwise		
D9703	Integer	= 1 if March 1997, 0 otherwise		
D9708	Integer	= 1 if August 1998, 0 otherwise		
D99	Integer	= 1 if 1999, 0 otherwise		
DEC	Integer	= 1 if December, 0 otherwise		
FEB	Integer	= 1 if February, 0 otherwise		
JAN	Integer	= 1 if January, 0 otherwise		
JUL	Integer	= 1 if July, 0 otherwise		
JUN	Integer	= 1 if June, 0 otherwise		
MAR	Integer	= 1 if March, 0 otherwise		
MAY	Integer	= 1 if May, 0 otherwise		
NGHHUUS	DMMB	Henry Hub natural gas spot price	NGM	STF
NOV	Integer	= 1 if November, 0 otherwise		
OCT	Integer	= 1 if October, 0 otherwise		
PRPCUUS	CPG	Propane price to petrochemical plants, all sellers	PMM	STF
PRPSPP1BLD	MMB	Propane stock change, PADD 1	PSM	STF
PRPSPP2BLD	MMB	Propane stock change, PADD 2	PSM	STF
PRPSPP3BLD	MMB	Propane stock change, PADD 3	PSM	STF
PRPSPP4BLD	MMB	Propane stock change, PADD 4	PSM	STF
PRPSPP5BLD	MMB	Propane stock change, PADD 5	PSM	STF
PRPSPP1	MMB	Propane end-of-month stocks, PADD 1	PSM	STF
PRPSPP2	MMB	Propane end-of-month stocks, PADD 2	PSM	STF
PRPSPP3	MMB	Propane end-of-month stocks, PADD 3	PSM	STF
PRPSPP4	MMB	Propane end-of-month stocks, PADD 4	PSM	STF
PRPSPP5	MMB	Propane end-of-month stocks, PADD 5	PSM	STF
PRPSPUS	MMB	Propane end-of-month stocks, U.S.	PSM	STF
PRRCAMW	CPG	Propane residential price after taxes, Midwest census region, all sellers	STF	STF
PRRCANE	CPG	Propane residential price after taxes, Northeast census region, all sellers	STF	STF
PRRCASO	CPG	Propane residential price after taxes, South census region, all sellers	STF	STF
PRRCAUS	CPG	Propane residential price after taxes, U.S., all sellers	STF	STF
PRRCAWE	CPG	Propane residential price after taxes, West census region, all sellers	STF	STF
PRRCPMW	MMBD	Propane residential deliveries, Midwest census region, all sellers	PMM	STF

PRRCPNE	MMBD	Propane residential deliveries, Northeast census region, all sellers	PMM	STF
PRRCPSO	MMBD	Propane residential deliveries, South census region, all sellers	PMM	STF
PRRCPUS	MMBD	Propane residential deliveries, U.S., all sellers	PMM	STF
PRRCPWE	MMBD	Propane residential deliveries, West census region, all sellers	PMM	STF
PRRCUMW	CPG	Propane residential price before taxes, Midwest census region, all sellers	PMM	STF
PRRCUNE	CPG	Propane residential price before taxes, Northeast census region, all sellers	PMM	STF
PRRCUSO	CPG	Propane residential price before taxes, South census region, all sellers	PMM	STF
PRRCUUS	CPG	Propane residential price before taxes, U.S., all sellers	PMM	STF
PRRCUWE	CPG	Propane residential price before taxes, West census region, all sellers	PMM	STF
PRTXUMW	Index	Propane State sales tax factor, Midwest census region	STF	ROT
PRTXUNE	Index	Propane State sales tax factor, Northeast census region	STF	ROT
PRTXUSO	Index	Propane State sales tax factor, South census region	STF	ROT
PRTXUWE	Index	Propane State sales tax factor, West census region	STF	ROT
QHLPGRECS_ENC	MM	No. homes with LPG as primary space heating fuel, E. North Central census div.	RECS	ROT
QHLPGRECS_ESC	MM	No. homes with LPG as primary space heating fuel, E. South Central census div.	RECS	ROT
QHLPGRECS_MAC	MM	No. homes with LPG as primary space heating fuel, Middle Atlantic census div.	RECS	ROT
QHLPGRECS_MTN	MM	No. homes with LPG as primary space heating fuel, Mountain census div.	RECS	ROT
QHLPGRECS_NEC	MM	No. homes with LPG as primary space heating fuel, New England census div.	RECS	ROT
QHLPGRECS_PAC	MM	No. homes with LPG as primary space heating fuel, Pacific census div.	RECS	ROT
QHLPGRECS_SAC	MM	No. homes with LPG as primary space heating fuel, South Atlantic census div.	RECS	ROT
QHLPGRECS_WNC	MM	No. homes with LPG as primary space heating fuel, W. North Central census div.	RECS	ROT
QHLPGRECS_WSC	MM	No. homes with LPG as primary space heating fuel, W. South Central census div.	RECS	ROT
RACPUUS	DBBL	Refiner average crude oil acquisition cost	PMM	EXO
SEP	Integer	= 1 if September, 0 otherwise		
TIME	Integer	= 1 to n, where n = number of observation		
ZO28IUS	Index	industrial production index for the chemical sector (SIC-28)	BLS	DRI
ZWHDENC	HDD	Heating degree-days, East North Central census division	NOAA	NOAA
ZWHDESC	HDD	Heating degree-days, East South Central census division	NOAA	NOAA
ZWHDMTN	HDD	Heating degree-days, Mountain census division	NOAA	NOAA
ZWHDPAC	HDD	Heating degree-days, Pacific census division	NOAA	NOAA
ZWHDPMA	HDD	Heating degree-days, Middle Atlantic census division	NOAA	NOAA
ZWHDPNE	HDD	Heating degree-days, New England census division	NOAA	NOAA
ZWHDSAC	HDD	Heating degree-days, South Atlantic census division	NOAA	NOAA
ZWHDWNC	HDD	Heating degree-days, West. North Central census division	NOAA	NOAA
ZWHDWSC	HDD	Heating degree-days, West South Central census division	NOAA	NOAA
ZWHNENC	HDD	Heating degree-days normal, East North Central census division	NOAA	NOAA
ZWHNESC	HDD	Heating degree-days normal, East South Central census division	NOAA	NOAA
ZWHNMTN	HDD	Heating degree-days normal, Mountain census division	NOAA	NOAA
ZWHNPAC	HDD	Heating degree-days normal, Pacific census division	NOAA	NOAA
ZWHNPMA	HDD	Heating degree-days normal, Middle Atlantic census division	NOAA	NOAA
ZWHNPNE	HDD	Heating degree-days normal, New England census division	NOAA	NOAA
ZWHNSAC	HDD	Heating degree-days normal, South Atlantic census division	NOAA	NOAA
ZWHNWNC	HDD	Heating degree-days normal, West. North Central census division	NOAA	NOAA
ZWHNWSC	HDD	Heating degree-days normal, West South Central census division	NOAA	NOAA

Table B2. Units Key

CPG	Cents per gallon
DBBL	Dollars per barrel
DMMB	Dollars per million Btu
HDD	Heating degree-days
Index	Index value
MM	Millions
MMB	Million barrels
MMBD	Million barrels per day

Table B3. Sources Key

BLS	Bureau of Labor Statistics
DRI	Global Insight DRI-WEFA
EXO	Exogenous
NGM	Natural Gas Monthly
NOAA	National Oceanic and Atmospheric Organization
PMM	Petroleum Marketing Monthly
PSM	Petroleum Supply Monthly
RECS	Residential Energy Consumption Survey
ROT	Rule-of-thumb
STF	STIFS Model

Appendix C. EViews Model Program File

```
'--------- Residential propane consumption ---------

:EQ_PRRCPNE
:EQ_PRRCPSO
:EQ_PRRCPMW
:EQ_PRRCPWE

@IDENTITY prrcpus  = prrcpne  + prrcpso  + prrcpmw  + prrcpwe

' --------  Residential Propane Prices Before State Taxes  ---------

:EQ_PRRCUNE
:EQ_PRRCUSO
:EQ_PRRCUMW
:EQ_PRRCUWE

@IDENTITY prrcuus  = (prrcpne  * prrcune  + prrcpso  * prrcuso  + prrcpmw  * prrcumw  +
prrcpwe  * prrcuwe)  / prrcpus

' ----------  Residential Propane Prices After State Taxes  ----------

@IDENTITY prrcane  = prrcune  * prtxune
@IDENTITY prrcaso  = prrcuso  * prtxuso
@IDENTITY prrcamw  = prrcumw  * prtxumw
@IDENTITY prrcawe  = prrcuwe  * prtxuwe

@IDENTITY prrcaus  = (prrcpne  * prrcane  + prrcpso  * prrcaso  + prrcpmw  * prrcamw  +
prrcpwe  * prrcawe)  / prrcpus

' --------  Propane price to petrochemical plants, all sellers ---------

:EQ_PRPCUUS

' --------  Propane Stocks ---------

:EQ_PRPSP1BLD
:EQ_PRPSP2BLD
:EQ_PRPSP3BLD
:EQ_PRPSP4BLD
:EQ_PRPSP5BLD

@IDENTITY prpspp1  = prpspp1(-1)  + prpsp1bld
@IDENTITY prpspp2  = prpspp2(-1)  + prpsp2bld
@IDENTITY prpspp3  = prpspp3(-1)  + prpsp3bld
@IDENTITY prpspp4  = prpspp4(-1)  + prpsp4bld
@IDENTITY prpspp5  = prpspp5(-1)  + prpsp5bld

@IDENTITY prpspus  = prpspp1  + prpspp2  + prpspp3  + prpspp4  + prpspp5
```

Appendix D. Regression Results

PRRCPNE, Residential Propane Demand Northeast Census Region
PRRCPSO, Residential Propane Demand South Census Region
PRRCPMW, Residential Propane Demand Midwest Census Region
PRRCPWE, Residential Propane Demand West Census Region
PRPCUUS, Propane Wholesale Price to Petrochemical Industry
PRRCUNE, Propane Retail Residential Price excluding taxes, Northeast Census Region
PRRCUSO, Propane Retail Residential Price excluding taxes, South Census Region
PRRCUMW, Propane Retail Residential Price excluding taxes, Midwest Census Region
PRRCUWE, Propane Retail Residential Price excluding taxes, West Census Region
PRPSP1BLD, Propane Stock Build (Draw) PADD 1
PRPSP2BLD, Propane Stock Build (Draw) PADD 2
PRPSP3BLD, Propane Stock Build (Draw) PADD 3
PRPSP4BLD, Propane Stock Build (Draw) PADD 4
PRPSP5BLD, Propane Stock Build (Draw) PADD 5

Dependent Variable: PRRCPNE

Method: Least Squares

Date: 01/06/05 Time: 09:43

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.079915	0.007485	10.67677	0.0000
(PRRCUNE/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.000288	0.000106	-2.707894	0.0080
(PRRCUNE/CICPIUS)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	-0.000140	0.000113	-1.238206	0.2186
(QHLPGHRECS_MAC*(ZWHDPMA-ZWHNPMA)/ZSAJQUS+QHLPGHRECS_NEC*(ZWHDPNE-ZWHNPNE)/ZSAJQUS)/(QHLPGHRECS_MAC+QHLPGHRECS_NEC)	0.001087	0.000186	5.838467	0.0000
(QHLPGHRECS_MAC(-1)*(ZWHDPMA(-1)-ZWHNPMA(-1))/ZSAJQUS(-1)+QHLPGHRECS_NEC(-1)*(ZWHDPNE(-1)-ZWHDPNE(-1))/ZSAJQUS(-1))/(QHLPGHRECS_MAC(-1)+QHLPGHRECS_NEC(-1))	0.001028	0.000301	3.411979	0.0009
(QHLPGHRECS_MAC+QHLPGHRECS_NEC)*(NOV+DEC+JAN+FEB+MAR)	0.024254	0.012657	1.916270	0.0582
(QHLPGHRECS_MAC+QHLPGHRECS_NEC)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.005795	0.010318	0.561684	0.5756
(D0212+D03ON)*(DEC+JAN+FEB)	0.023485	0.002559	9.177381	0.0000
D03ON*(MAR+APR+MAY+JUN+JUL+AUG+SEP+OCT+NOV)	0.009125	0.001473	6.193669	0.0000
JAN	0.011445	0.001979	5.782396	0.0000
FEB	0.010284	0.002006	5.125818	0.0000
MAR	-0.003598	0.002105	-1.709467	0.0905
APR	-0.031054	0.010546	-2.944739	0.0040
MAY	-0.044158	0.010618	-4.158617	0.0001
JUN	-0.047288	0.010638	-4.445042	0.0000
JUL	-0.051495	0.010613	-4.852162	0.0000
AUG	-0.049928	0.010562	-4.727109	0.0000
SEP	-0.040413	0.010513	-3.844224	0.0002
OCT	-0.034863	0.010544	-3.306388	0.0013
NOV	-0.017833	0.002105	-8.470464	0.0000

R-squared	0.969713	Mean dependent var	0.044417
Adjusted R-squared	0.963841	S.D. dependent var	0.022357

S.E. of regression	0.004251	Akaike info criterion	-7.929890
Sum squared resid	0.001771	Schwarz criterion	-7.460282
Log likelihood	487.8635	F-statistic	165.1408
Durbin-Watson stat	1.351138	Prob(F-statistic)	0.000000

Dependent Variable: PRRCPSO

Method: Least Squares

Date: 01/06/05 Time: 09:47

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.021190	0.087459	0.242284	0.8091
(PRRCUSO/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.001154	0.000256	-4.515111	0.0000
(PRRCUSO/CICPIUS)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	8.66E-06	0.000251	0.034437	0.9726
(QHLPGHRECS_ESC*(ZWHDESC-ZWHNESC)/ZSAJQUS+QHLPGHRECS_WSC*(ZWHDWSC-ZWHNWSC)/ZSAJQUS+QHLPGHRECS_SAC*(ZWHDPSA-ZWHNPSA)/ZSAJQUS)/(QHLPGHRECS_ESC+QHLPGHRECS_WSC+QHLPGHRECS_SAC)	0.006241	0.000714	8.745786	0.0000
(QHLPGHRECS_ESC(-1)*(ZWHDESC(-1)-ZWHNESC(-1))/ZSAJQUS(-1)+QHLPGHRECS_WSC(-1)*(ZWHDWSC(-1)-ZWHNWSC(-1))/ZSAJQUS(-1)+QHLPGHRECS_SAC(-1)*(ZWHDPSA(-1)-ZWHNPSA(-1))/ZSAJQUS(-1))/(QHLPGHRECS_ESC(-1)+QHLPGHRECS_WSC(-1)+QHLPGHRECS_SAC(-1))	0.003591	0.000785	4.576656	0.0000
(QHLPGHRECS_ESC+QHLPGHRECS_WSC+QHLPGHRECS_SAC)*(NOV+DEC+JAN+FEB+MAR)	0.123241	0.037317	3.302533	0.0013
(QHLPGHRECS_ESC+QHLPGHRECS_WSC+QHLPGHRECS_SAC)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.041509	0.032330	1.283921	0.2021
JAN	0.037128	0.006114	6.072207	0.0000
FEB	0.009733	0.006249	1.557453	0.1225
MAR	-0.068882	0.006042	-11.39980	0.0000
APR	-0.047282	0.115137	-0.410664	0.6822
MAY	-0.067693	0.114869	-0.589304	0.5570
JUN	-0.068748	0.114618	-0.599804	0.5500
JUL	-0.068098	0.114412	-0.595199	0.5531

AUG	-0.049075	0.114211	-0.429686	0.6683
SEP	-0.025087	0.114368	-0.219352	0.8268
OCT	-0.009111	0.114600	-0.079504	0.9368
NOV	-0.076570	0.006089	-12.57517	0.0000

R-squared	0.969049	Mean dependent var	0.104067
Adjusted R-squared	0.963787	S.D. dependent var	0.067413
S.E. of regression	0.012828	Akaike info criterion	-5.734746
Sum squared resid	0.016457	Schwarz criterion	-5.312100
Log likelihood	356.3500	F-statistic	184.1714
Durbin-Watson stat	1.575036	Prob(F-statistic)	0.000000

Dependent Variable: PRRCPMW

Method: Least Squares

Date: 01/13/05 Time: 10:58

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.246694	0.104621	2.357980	0.0204
(PRRCUMW/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.000537	0.000280	-1.921860	0.0575
(PRRCUMW/CICPIUS)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	-0.000266	0.000323	-0.822809	0.4126
(QHLPGHRECS_ENC*(ZWHDENC-ZWHNENC)/ZSAJQUS+QHLPGHRECS_WNC*(ZWHDWNC-ZWHNWNC)/ZSAJQUS)/(QHLPGHRECS_ENC+QHLPGHRECS_WNC)	0.005558	0.000434	12.79593	0.0000
(QHLPGHRECS_ENC(-1)*(ZWHDENC(-1)-ZWHNENC(-1))/ZSAJQUS(-1)+QHLPGHRECS_WNC(-1)*(ZWHDWNC(-1)-ZWHDWNC(-1))/ZSAJQUS(-1))/(QHLPGHRECS_ENC(-1)+QHLPGHRECS_WNC(-1))	0.003452	0.000831	4.154750	0.0001
(QHLPGHRECS_ENC+QHLPGHRECS_WNC)*(NOV+DEC+JAN+FEB+MAR)	0.012437	0.062181	0.200018	0.8419
(QHLPGHRECS_ENC+QHLPGHRECS_WNC)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.098723	0.052267	1.888837	0.0619
(D0212+D03ON)*(DEC+JAN+FEB)	0.043865	0.007137	6.146070	0.0000
D03ON*(MAR+APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.009850	0.004714	2.089785	0.0392
JAN	0.047754	0.005537	8.624196	0.0000
FEB	0.006916	0.005567	1.242332	0.2171

MAR	-0.076632	0.005896	-12.99711	0.0000
APR	-0.323488	0.126576	-2.555672	0.0121
MAY	-0.364757	0.126657	-2.879877	0.0049
JUN	-0.370741	0.126864	-2.922351	0.0043
JUL	-0.358235	0.127068	-2.819231	0.0058
AUG	-0.328171	0.127126	-2.581468	0.0113
SEP	-0.302519	0.127089	-2.380379	0.0192
OCT	-0.283421	0.126996	-2.231738	0.0279
NOV	-0.074254	0.005970	-12.43793	0.0000

R-squared	0.982473	Mean dependent var	0.136977
Adjusted R-squared	0.979075	S.D. dependent var	0.082823
S.E. of regression	0.011981	Akaike info criterion	-5.857779
Sum squared resid	0.014067	Schwarz criterion	-5.388172
Log likelihood	365.6090	F-statistic	289.1282
Durbin-Watson stat	1.813696	Prob(F-statistic)	0.000000

Dependent Variable: PRRCPWE

Method: Least Squares

Date: 01/06/05 Time: 11:01

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.067977	0.004065	16.72223	0.0000
(PRRCUWE/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.000394	5.68E-05	-6.928227	0.0000
(PRRCUWE/CICPIUS)*(APR*MAY+JUN+JUL+AUG+SEP+OCT)	-0.000306	8.76E-05	-3.491019	0.0007
(QHLPGHRECS_MTN*(ZWHDMTN-ZWHNMTN)/ZSAJQUS+QHLPGHRECS_PAC*(ZWHDPAC-ZWHNPAC)/ZSAJQUS)/(QHLPGHRECS_MTN+QHLPGHRECS_PAC)	0.001469	0.000198	7.426422	0.0000
(QHLPGHRECS_MTN(-1)*(ZWHDMTN(-1)-ZWHNMTN(-1))/ZSAJQUS(-1)+QHLPGHRECS_PAC(-1)*(ZWHDPAC(-1)-ZWHNPAC(-1))/ZSAJQUS(-1))/(QHLPGHRECS_MTN(-1)+QHLPGHRECS_PAC(-1))	0.000941	0.000200	4.712916	0.0000
(QHLPGHRECS_MTN+QHLPGHRECS_PAC)*(NOV+DEC+JAN+FEB+MAR)	0.042582	0.004944	8.612013	0.0000

(QHLPGHRECS_MTN+QHLPGHRECS_PAC)*(APR*MAY+JUN+JUL+AUG+SEP+OCT)	0.014009	0.005390	2.598888	0.0108
D03ON	0.006678	0.000995	6.708797	0.0000
JAN	0.001626	0.001473	1.103389	0.2725
FEB	-0.005339	0.001486	-3.593678	0.0005
MAR	-0.015189	0.001477	-10.28044	0.0000
APR	-0.030870	0.004216	-7.321269	0.0000
MAY	-0.040982	0.004249	-9.645238	0.0000
JUN	-0.034183	0.005236	-6.528574	0.0000
JUL	-0.037750	0.005143	-7.340652	0.0000
AUG	-0.033855	0.005110	-6.625127	0.0000
SEP	-0.025815	0.005203	-4.961549	0.0000
OCT	-0.021464	0.005382	-3.987936	0.0001
NOV	-0.020308	0.001517	-13.38311	0.0000

R-squared	0.969143	Mean dependent var	0.041532
Adjusted R-squared	0.963533	S.D. dependent var	0.016615
S.E. of regression	0.003173	Akaike info criterion	-8.521838
Sum squared resid	0.000997	Schwarz criterion	-8.075711
Log likelihood	521.7885	F-statistic	172.7415
Durbin-Watson stat	1.218699	Prob(F-statistic)	0.000000

Dependent Variable: PRRCPNE

Method: Least Squares

Date: 01/06/05 Time: 09:43

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.079915	0.007485	10.67677	0.0000
(PRRCUNE/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.000288	0.000106	-2.707894	0.0080
(PRRCUNE/CICPIUS)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	-0.000140	0.000113	-1.238206	0.2186
(QHLPGHRECS_MAC*(ZWHDPMA-ZWHNPMA)/ZSAJQUS+QHLPGHRECS_NEC*(ZWHDPNE-ZWHNPNE)/ZSAJQUS)/(QHLPGHRECS_MAC+QHLPGHRECS_NEC)	0.001087	0.000186	5.838467	0.0000
(QHLPGHRECS_MAC(-1)*(ZWHDPMA(-1)-ZWHNPMA(-1))/ZSAJQUS(-	0.001028	0.000301	3.411979	0.0009

1)+QHLPGHRECS_NEC(-1)*(ZWHDPNE(-1)-ZWHDPNE(-1))/ZSAJQUS(-1))/(QHLPGHRECS_MAC(-1)+QHLPGHRECS_NEC(-1))				
(QHLPGHRECS_MAC+QHLPGHRECS_NEC)*(NOV+DEC+JAN+FEB+MAR)	0.024254	0.012657	1.916270	0.0582
(QHLPGHRECS_MAC+QHLPGHRECS_NEC)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.005795	0.010318	0.561684	0.5756
(D0212+D03ON)*(DEC+JAN+FEB)	0.023485	0.002559	9.177381	0.0000
D03ON*(MAR+APR+MAY+JUN+JUL+AUG+SEP+OCT+NOV)	0.009125	0.001473	6.193669	0.0000
JAN	0.011445	0.001979	5.782396	0.0000
FEB	0.010284	0.002006	5.125818	0.0000
MAR	-0.003598	0.002105	-1.709467	0.0905
APR	-0.031054	0.010546	-2.944739	0.0040
MAY	-0.044158	0.010618	-4.158617	0.0001
JUN	-0.047288	0.010638	-4.445042	0.0000
JUL	-0.051495	0.010613	-4.852162	0.0000
AUG	-0.049928	0.010562	-4.727109	0.0000
SEP	-0.040413	0.010513	-3.844224	0.0002
OCT	-0.034863	0.010544	-3.306388	0.0013
NOV	-0.017833	0.002105	-8.470464	0.0000

R-squared	0.969713	Mean dependent var	0.044417
Adjusted R-squared	0.963841	S.D. dependent var	0.022357
S.E. of regression	0.004251	Akaike info criterion	-7.929890
Sum squared resid	0.001771	Schwarz criterion	-7.460282
Log likelihood	487.8635	F-statistic	165.1408
Durbin-Watson stat	1.351138	Prob(F-statistic)	0.000000

Dependent Variable: PRRCPSO

Method: Least Squares

Date: 01/06/05 Time: 09:47

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.021190	0.087459	0.242284	0.8091
(PRRCUSO/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.001154	0.000256	-4.515111	0.0000

(PRRCUSO/CICPIUS)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	8.66E-06	0.000251	0.034437	0.9726
(QHLPGHRECS_ESC*(ZWHDESC-ZWHNESC)/ZSAJQUS+QHLPGHRECS_WSC*(ZWHDWSC-ZWHNWSC)/ZSAJQUS+QHLPGHRECS_SAC*(ZWHDPSA-ZWHNPSA)/ZSAJQUS)/(QHLPGHRECS_ESC+QHLPGHRECS_WSC+QHLPGHRECS_SAC)	0.006241	0.000714	8.745786	0.0000
(QHLPGHRECS_ESC(-1)*(ZWHDESC(-1)-ZWHNESC(-1))/ZSAJQUS(-1)+QHLPGHRECS_WSC(-1)*(ZWHDWSC(-1)-ZWHNWSC(-1))/ZSAJQUS(-1)+QHLPGHRECS_SAC(-1)*(ZWHDPSA(-1)-ZWHNPSA(-1))/ZSAJQUS(-1))/(QHLPGHRECS_ESC(-1)+QHLPGHRECS_WSC(-1)+QHLPGHRECS_SAC(-1))	0.003591	0.000785	4.576656	0.0000
(QHLPGHRECS_ESC+QHLPGHRECS_WSC+QHLPGHRECS_SAC)*(NOV+DEC+JAN+FEB+MAR)	0.123241	0.037317	3.302533	0.0013
(QHLPGHRECS_ESC+QHLPGHRECS_WSC+QHLPGHRECS_SAC)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.041509	0.032330	1.283921	0.2021
JAN	0.037128	0.006114	6.072207	0.0000
FEB	0.009733	0.006249	1.557453	0.1225
MAR	-0.068882	0.006042	-11.39980	0.0000
APR	-0.047282	0.115137	-0.410664	0.6822
MAY	-0.067693	0.114869	-0.589304	0.5570
JUN	-0.068748	0.114618	-0.599804	0.5500
JUL	-0.068098	0.114412	-0.595199	0.5531
AUG	-0.049075	0.114211	-0.429686	0.6683
SEP	-0.025087	0.114368	-0.219352	0.8268
OCT	-0.009111	0.114600	-0.079504	0.9368
NOV	-0.076570	0.006089	-12.57517	0.0000

R-squared	0.969049	Mean dependent var	0.104067
Adjusted R-squared	0.963787	S.D. dependent var	0.067413
S.E. of regression	0.012828	Akaike info criterion	-5.734746
Sum squared resid	0.016457	Schwarz criterion	-5.312100
Log likelihood	356.3500	F-statistic	184.1714
Durbin-Watson stat	1.575036	Prob(F-statistic)	0.000000

Dependent Variable: PRRCPMW

Method: Least Squares

Date: 01/13/05 Time: 10:58

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.246694	0.104621	2.357980	0.0204
(PRRCUMW/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.000537	0.000280	-1.921860	0.0575
(PRRCUMW/CICPIUS)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	-0.000266	0.000323	-0.822809	0.4126
(QHLPGHRECS_ENC*(ZWHDENC-ZWHNENC)/ZSAJQUS+QHLPGHRECS_WNC*(ZWHDWNC-ZWHNWNC)/ZSAJQUS)/(QHLPGHRECS_ENC+QHLPGHRECS_WNC)	0.005558	0.000434	12.79593	0.0000
(QHLPGHRECS_ENC(-1)*(ZWHDENC(-1)-ZWHNENC(-1))/ZSAJQUS(-1)+QHLPGHRECS_WNC(-1)*(ZWHDWNC(-1)-ZWHDWNC(-1))/ZSAJQUS(-1))/(QHLPGHRECS_ENC(-1)+QHLPGHRECS_WNC(-1))	0.003452	0.000831	4.154750	0.0001
(QHLPGHRECS_ENC+QHLPGHRECS_WNC)*(NOV+DEC+JAN+FEB+MAR)	0.012437	0.062181	0.200018	0.8419
(QHLPGHRECS_ENC+QHLPGHRECS_WNC)*(APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.098723	0.052267	1.888837	0.0619
(D0212+D03ON)*(DEC+JAN+FEB)	0.043865	0.007137	6.146070	0.0000
D03ON*(MAR+APR+MAY+JUN+JUL+AUG+SEP+OCT)	0.009850	0.004714	2.089785	0.0392
JAN	0.047754	0.005537	8.624196	0.0000
FEB	0.006916	0.005567	1.242332	0.2171
MAR	-0.076632	0.005896	-12.99711	0.0000
APR	-0.323488	0.126576	-2.555672	0.0121
MAY	-0.364757	0.126657	-2.879877	0.0049
JUN	-0.370741	0.126864	-2.922351	0.0043
JUL	-0.358235	0.127068	-2.819231	0.0058
AUG	-0.328171	0.127126	-2.581468	0.0113
SEP	-0.302519	0.127089	-2.380379	0.0192
OCT	-0.283421	0.126996	-2.231738	0.0279
NOV	-0.074254	0.005970	-12.43793	0.0000

R-squared	0.982473	Mean dependent var	0.136977
Adjusted R-squared	0.979075	S.D. dependent var	0.082823
S.E. of regression	0.011981	Akaike info criterion	-5.857779
Sum squared resid	0.014067	Schwarz criterion	-5.388172
Log likelihood	365.6090	F-statistic	289.1282
Durbin-Watson stat	1.813696	Prob(F-statistic)	0.000000

Dependent Variable: PRRCPWE

Method: Least Squares

Date: 01/06/05 Time: 11:01

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.067977	0.004065	16.72223	0.0000
(PRRCUWE/CICPIUS)*(NOV+DEC+JAN+FEB+MAR)	-0.000394	5.68E-05	-6.928227	0.0000
(PRRCUWE/CICPIUS)*(APR*MAY+JUN+JUL+AUG+SEP+OCT)	-0.000306	8.76E-05	-3.491019	0.0007
(QHLPGHRECS_MTN*(ZWHDMTN-ZWHNMTN)/ZSAJQUS+QHLPGHRECS_PAC*(ZWHDPAC-ZWHNPAC)/ZSAJQUS)/(QHLPGHRECS_MTN+QHLPGHRECS_PAC)	0.001469	0.000198	7.426422	0.0000
(QHLPGHRECS_MTN(-1)*(ZWHDMTN(-1)-ZWHNMTN(-1))/ZSAJQUS(-1)+QHLPGHRECS_PAC(-1)*(ZWHDPAC(-1)-ZWHNPAC(-1))/ZSAJQUS(-1))/(QHLPGHRECS_MTN(-1)+QHLPGHRECS_PAC(-1))	0.000941	0.000200	4.712916	0.0000
(QHLPGHRECS_MTN+QHLPGHRECS_PAC)*(NOV+DEC+JAN+FEB+MAR)	0.042582	0.004944	8.612013	0.0000
(QHLPGHRECS_MTN+QHLPGHRECS_PAC)*(APR*MAY+JUN+JUL+AUG+SEP+OCT)	0.014009	0.005390	2.598888	0.0108
D03ON	0.006678	0.000995	6.708797	0.0000
JAN	0.001626	0.001473	1.103389	0.2725
FEB	-0.005339	0.001486	-3.593678	0.0005
MAR	-0.015189	0.001477	-10.28044	0.0000
APR	-0.030870	0.004216	-7.321269	0.0000
MAY	-0.040982	0.004249	-9.645238	0.0000
JUN	-0.034183	0.005236	-6.528574	0.0000
JUL	-0.037750	0.005143	-7.340652	0.0000
AUG	-0.033855	0.005110	-6.625127	0.0000
SEP	-0.025815	0.005203	-4.961549	0.0000
OCT	-0.021464	0.005382	-3.987936	0.0001
NOV	-0.020308	0.001517	-13.38311	0.0000

R-squared	0.969143	Mean dependent var	0.041532
Adjusted R-squared	0.963533	S.D. dependent var	0.016615

S.E. of regression	0.003173	Akaike info criterion	-8.521838
Sum squared resid	0.000997	Schwarz criterion	-8.075711
Log likelihood	521.7885	F-statistic	172.7415
Durbin-Watson stat	1.218699	Prob(F-statistic)	0.000000

Dependent Variable: PRPCUUS
Method: Least Squares
Date: 02/18/05 Time: 14:24
Sample: 1995M01 2004M10
Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.95913	5.864727	-2.039162	0.0442
100*RACPUUS/42	0.379566	0.087798	4.323151	0.0000
(100*RACPUUS/42)^2	0.001481	0.000566	2.619501	0.0103
NGHHUUS	1.275341	0.959316	1.329427	0.1869
NGHHUUS^2	0.127021	0.087105	1.458255	0.1481
PRPCUUS(-1)-100*RACPUUS(-1)/42	0.410342	0.047624	8.616364	0.0000
PRPCUUS(-1)-9.1*NGHHUUS(-1)	0.199819	0.045620	4.380053	0.0000
PRPSPUS(-1)-(PRPSPUS(-13)+PRPSPUS(-25)+PRPSPUS(-37)+PRPSPUS(-49))/4	-0.261679	0.045651	-5.732211	0.0000
ZO28IUS	0.244703	0.065786	3.719663	0.0003
D0101	14.73901	2.660857	5.539198	0.0000
D9611+D9612	6.835117	1.569894	4.353871	0.0000
D0303	6.660084	2.177772	3.058210	0.0029
D0401	8.757433	2.098421	4.173344	0.0001
JAN	1.544122	0.985922	1.566170	0.1207
FEB	0.537549	0.934839	0.575018	0.5667
MAR	-0.168365	0.963959	-0.174660	0.8617
APR	-0.551679	0.934245	-0.590508	0.5563
MAY	-0.422107	0.966122	-0.436908	0.6632
JUN	0.768862	0.976096	0.787691	0.4329
JUL	0.839461	0.989277	0.848560	0.3983
AUG	1.612735	0.977427	1.649980	0.1023
SEP	1.394483	0.966435	1.442915	0.1524
OCT	2.433102	0.955495	2.546431	0.0125

NOV	2.480253	0.939628	2.639612	0.0097

R-squared	0.984611	Mean dependent var	43.81695
Adjusted R-squared	0.980846	S.D. dependent var	13.85957
S.E. of regression	1.918143	Akaike info criterion	4.319982
Sum squared resid	345.8516	Schwarz criterion	4.883511
Log likelihood	-230.8789	F-statistic	261.4930
Durbin-Watson stat	1.790668	Prob(F-statistic)	0.000000

Dependent Variable: PRRCUNE-PRPCUUS

Method: Least Squares

Date: 04/12/05 Time: 15:59

Sample: 1995M01 2004M12

Included observations: 120

Convergence achieved after 10 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	81.50174	1.146016	71.11746	0.0000
PRPCUUS-PRPCUUS(-1)	-0.437450	0.036405	-12.01625	0.0000
PRPSPP1(-1)-(PRPSPP1(-13)+PRPSPP1(-25)+PRPSPP1(-37)+PRPSPP1(-49))/4	-0.114260	0.341855	-0.334237	0.7389
((QHLPGHRECS_MAC*(ZWHDPMA-ZWHNPMA)/ZSAJQUS)+(QHLPGHRECS_NEC*(ZWHDPNE-ZWHNPNE)/ZSAJQUS))/(QHLPGHRECS_MAC+QHLPGHRECS_NEC)	-0.084542	0.068537	-1.233520	0.2203
D00	6.962935	1.661531	4.190674	0.0001
D0001	-6.900962	1.785724	-3.864518	0.0002
D01ON	12.54407	1.387365	9.041651	0.0000
D0303	9.005569	1.559481	5.774722	0.0000
JAN	1.596422	0.651330	2.451019	0.0160
FEB	2.504412	0.814190	3.075954	0.0027
MAR	3.444985	0.939558	3.666602	0.0004
APR	4.664900	0.993049	4.697551	0.0000
MAY	6.893049	1.028432	6.702486	0.0000
JUN	7.292274	1.038939	7.018962	0.0000
JUL	6.394624	1.027306	6.224651	0.0000
AUG	3.896918	0.994034	3.920308	0.0002

SEP	1.951827	0.921841	2.117315	0.0367
OCT	1.954043	0.812859	2.403915	0.0181
NOV	-0.470214	0.615558	-0.763881	0.4467
AR(1)	0.762742	0.067119	11.36397	0.0000

R-squared	0.950213	Mean dependent var	90.28425
Adjusted R-squared	0.940753	S.D. dependent var	7.513830
S.E. of regression	1.828921	Akaike info criterion	4.196341
Sum squared resid	334.4951	Schwarz criterion	4.660923
Log likelihood	-231.7804	F-statistic	100.4493
Durbin-Watson stat	1.857283	Prob(F-statistic)	0.000000

Inverted AR Roots	.76

Dependent Variable: PRRCUSO-PRPCUUS

Method: Least Squares

Date: 04/12/05 Time: 16:03

Sample: 1995M01 2004M12

Included observations: 120

Convergence achieved after 5 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	70.11642	2.345395	29.89536	0.0000
PRPCUUS-PRPCUUS(-1)	-0.438545	0.045551	-9.627548	0.0000
PRPSPP1(-1)-(PRPSPP1(-13)+PRPSPP1(-25)+PRPSPP1(-37)+PRPSPP1(-49))/4	-0.420777	0.408901	-1.029045	0.3059
((QHLPGHRECS_ESC*(ZWHDESC-ZWHNESC)/ZSAJQUS)+(QHLPGHRECS_WSC*(ZWHDWSC-ZWHNWSC)/ZSAJQUS)+(QHLPGHRECS_SAC*(ZWHDPSA-ZWHNPSA)/ZSAJQUS))/(QHLPGHRECS_ESC+QHLPGHRECS_WSC+QHLPGHRECS_SAC)	-0.129489	0.107764	-1.201598	0.2323
D0012	14.47254	2.343688	6.175114	0.0000
D0101	19.18934	2.471380	7.764626	0.0000
D01ON	13.30475	2.870730	4.634621	0.0000
JAN	2.957261	0.754815	3.917862	0.0002
FEB	4.775394	0.988233	4.832253	0.0000
MAR	3.536858	1.129622	3.131010	0.0023

APR	1.545470	1.218130	1.268724	0.2075
MAY	-0.292577	1.268363	-0.230673	0.8180
JUN	-3.943796	1.283432	-3.072852	0.0027
JUL	-7.942533	1.265254	-6.277420	0.0000
AUG	-11.91762	1.220084	-9.767869	0.0000
SEP	-10.09924	1.122910	-8.993808	0.0000
OCT	-6.387061	0.986510	-6.474403	0.0000
NOV	-3.970863	0.746960	-5.316034	0.0000
AR(1)	0.876471	0.048974	17.89660	0.0000

R-squared	0.965427	Mean dependent var	71.90995
Adjusted R-squared	0.959266	S.D. dependent var	10.96743
S.E. of regression	2.213523	Akaike info criterion	4.571343
Sum squared resid	494.8682	Schwarz criterion	5.012696
Log likelihood	-255.2806	F-statistic	156.6879
Durbin-Watson stat	1.753379	Prob(F-statistic)	0.000000

Inverted AR Roots	.88

Dependent Variable: PRRCUMW-PRPCUUS

Method: Least Squares

Date: 04/12/05 Time: 16:05

Sample: 1995M01 2004M12

Included observations: 120

Convergence achieved after 17 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	44.06538	2.079519	21.19018	0.0000
PRPCUUS-PRPCUUS(-1)	-0.366065	0.043796	-8.358479	0.0000
PRPSPP2(-1)-(PRPSPP2(-13)+PRPSPP2(-25)+PRPSPP2(-37)+PRPSPP2(-49))/4	0.026362	0.169924	0.155138	0.8770
((QHLPGHRECS_ENC*(ZWHDENC-ZWHNENC)/ZSAJQUS)+(QHLPGHRECS_WNC*(ZWHDWNC-ZWHNWNC)/ZSAJQUS))/(QHLPGHRECS_ENC+QHLPGHRECS_WNC)	0.009300	0.073717	0.126159	0.8999
D9612	7.694556	1.906361	4.036253	0.0001
D0012	6.759581	2.392069	2.825830	0.0057

D01ON	9.674328	2.421881	3.994551	0.0001
JAN	1.855359	0.819478	2.264074	0.0257
FEB	1.400236	1.046139	1.338480	0.1837
MAR	1.143262	1.217857	0.938750	0.3501
APR	0.643633	1.308864	0.491749	0.6240
MAY	-0.022626	1.362329	-0.016608	0.9868
JUN	-3.837830	1.391657	-2.757742	0.0069
JUL	-7.655189	1.366813	-5.600759	0.0000
AUG	-9.318534	1.323762	-7.039431	0.0000
SEP	-8.357473	1.218256	-6.860195	0.0000
OCT	-7.065073	1.072045	-6.590275	0.0000
NOV	-4.385299	0.818960	-5.354718	0.0000
AR(1)	0.856819	0.053076	16.14336	0.0000

R-squared	0.928864	Mean dependent var	44.49800
Adjusted R-squared	0.916186	S.D. dependent var	8.029728
S.E. of regression	2.324654	Akaike info criterion	4.669315
Sum squared resid	545.8058	Schwarz criterion	5.110668
Log likelihood	-261.1589	F-statistic	73.26752
Durbin-Watson stat	1.600858	Prob(F-statistic)	0.000000

Inverted AR Roots	.86

Dependent Variable: PRRCUWE-PRPCUUS

Method: Least Squares

Date: 04/12/05 Time: 16:06

Sample: 1995M01 2004M12

Included observations: 120

Convergence achieved after 12 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	65.64023	2.180898	30.09780	0.0000
PRPCUUS-PRPCUUS(-1)	-0.524549	0.043677	-12.00970	0.0000
PRPSPP5(-1)-(PRPSPP5(-13)+PRPSPP5(-25)+PRPSPP5(-37)+PRPSPP5(-49))/4	-2.593776	1.084791	-2.391037	0.0187
((QHLPGHRECS_MTN*(ZWHDMTN-ZWHNMTN)/ZSAJQUS)+(QHLPGHRECS_PAC*(ZW	-0.138465	0.120671	-1.147463	0.2539

HDPAC-ZWHNPAC)/ZSAJQUS))/(QHLPGHRECS_MTN+QHLPGHRECS_PAC)				
D0012	10.14608	2.428954	4.177139	0.0001
D01ON	17.55587	2.495358	7.035410	0.0000
D0202	7.807387	1.905235	4.097861	0.0001
JAN	1.858803	0.797861	2.329733	0.0218
FEB	0.334613	1.063145	0.314739	0.7536
MAR	-0.427038	1.207665	-0.353606	0.7244
APR	-2.148786	1.304004	-1.647837	0.1025
MAY	-4.966021	1.347523	-3.685295	0.0004
JUN	-8.498637	1.360976	-6.244517	0.0000
JUL	-12.94395	1.338503	-9.670468	0.0000
AUG	-15.38707	1.287034	-11.95545	0.0000
SEP	-12.90117	1.184324	-10.89327	0.0000
OCT	-6.718139	1.034776	-6.492359	0.0000
NOV	-4.226345	0.785109	-5.383134	0.0000
AR(1)	0.864501	0.050969	16.96135	0.0000

R-squared	0.967737	Mean dependent var	66.19921
Adjusted R-squared	0.961987	S.D. dependent var	11.97446
S.E. of regression	2.334660	Akaike info criterion	4.677905
Sum squared resid	550.5145	Schwarz criterion	5.119258
Log likelihood	-261.6743	F-statistic	168.3047
Durbin-Watson stat	1.475821	Prob(F-statistic)	0.000000

Inverted AR Roots	.86

Dependent Variable: PRPSP1BLD

Method: Least Squares

Date: 02/18/05 Time: 14:27

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.619866	0.151076	-4.103024	0.0001
(QHLPGHRECS_NEC*(ZWHDPNE-	-0.357781	0.067367	-5.310898	0.0000

ZWHNPNE)/ZSAJQUS+QHLPGHRECS_MAC*(ZWHDPMA-ZWHNPMA)/ZSAJQUS+QHLPGHRECS_SAC*(ZWHDPSA-ZWHDPSA)/ZSAJQUS)/(QHLPGHRECS_NEC+QHLPGHRECS_MAC+QHLPGHRECS_SAC)				
PRPCUUS-9.1*NGHHUUS	0.004092	0.005306	0.771195	0.4424
PRPCUUS-100*RACPUUS/42	0.007293	0.006885	1.059237	0.2920
PRPSPP1(-1)-((PRPSPP1(-13)+PRPSPP1(-25)+PRPSPP1(-37)+PRPSPP1(-49))/4)	-0.365761	0.060375	-6.058172	0.0000
JAN	-0.792411	0.193462	-4.095950	0.0001
FEB	-0.014541	0.191924	-0.075763	0.9398
MAR	0.548310	0.193416	2.834878	0.0055
APR	0.901668	0.193583	4.657794	0.0000
MAY	1.258608	0.195323	6.443729	0.0000
JUN	1.273930	0.194086	6.563724	0.0000
JUL	1.418074	0.196172	7.228720	0.0000
AUG	1.016115	0.197554	5.143466	0.0000
SEP	0.716773	0.198369	3.613332	0.0005
OCT	0.831777	0.197102	4.220038	0.0001
NOV	0.580828	0.199047	2.918050	0.0043

R-squared	0.748512	Mean dependent var	0.003169
Adjusted R-squared	0.711528	S.D. dependent var	0.773435
S.E. of regression	0.415409	Akaike info criterion	1.206367
Sum squared resid	17.60156	Schwarz criterion	1.582053
Log likelihood	-55.17563	F-statistic	20.23902
Durbin-Watson stat	2.061471	Prob(F-statistic)	0.000000

Dependent Variable: PRPSP2BLD

Method: Least Squares

Date: 02/18/05 Time: 14:28

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.862084	0.428147	-9.020462	0.0000
(QHLPGHRECS_ENC*(ZWHDENC-ZWHNENC)/ZSAJQUS+QHLPGHRECS_WNC*(ZWHDWNC-	-0.210248	0.037699	-5.576943	0.0000

ZWHNWNC)/ZSAJQUS)/(QHLPGHRECS_ENC+QHLPGHRECS_WNC)				
PRPCUUS-9.1*NGHHUUS	0.005487	0.014950	0.367002	0.7144
PRPCUUS-100*RACPUUS/42	0.052690	0.019442	2.710079	0.0079
PRPSPP2(-1)-((PRPSPP2(-13)+PRPSPP2(-25)+PRPSPP2(-37)+PRPSPP2(-49))/4)	-0.100337	0.029310	-3.423335	0.0009
JAN	-1.711117	0.536184	-3.191290	0.0019
FEB	0.347510	0.534872	0.649707	0.5173
MAR	3.588260	0.541549	6.625919	0.0000
APR	6.299991	0.538803	11.69258	0.0000
MAY	7.624250	0.543697	14.02298	0.0000
JUN	8.111807	0.540642	15.00403	0.0000
JUL	7.454972	0.545279	13.67186	0.0000
AUG	6.768474	0.549353	12.32082	0.0000
SEP	5.147560	0.552820	9.311463	0.0000
OCT	3.503629	0.547467	6.399715	0.0000
NOV	3.192948	0.552857	5.775364	0.0000

R-squared	0.890315	Mean dependent var	0.046034
Adjusted R-squared	0.874185	S.D. dependent var	3.259761
S.E. of regression	1.156251	Akaike info criterion	3.253718
Sum squared resid	136.3655	Schwarz criterion	3.629404
Log likelihood	-175.9694	F-statistic	55.19571
Durbin-Watson stat	1.283747	Prob(F-statistic)	0.000000

Dependent Variable: PRPSP3BLD

Method: Least Squares

Date: 02/18/05 Time: 14:28

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.830812	1.675520	-3.480001	0.0007
(QHLPGHRECS_ESC*(ZWHDESC-ZWHNESC)/ZSAJQUS+QHLPGHRECS_WSC*(ZWHDWSC-ZWHDWSC)/ZSAJQUS)/(QHLPGHRECS_ESC+QHLPGHRECS_WSC)	-0.396393	0.109483	-3.620575	0.0005
PRPCUUS-9.1*NGHHUUS	0.023937	0.024714	0.968569	0.3351

PRPCUUS-100*RACPUUS/42	0.097449	0.030143	3.232876	0.0017
PRPSPP3(-1)-((PRPSPP3(-13)+PRPSPP3(-25)+PRPSPP3(-37)+PRPSPP3(-49))/4)	-0.106635	0.039557	-2.695745	0.0083
TIME	0.007945	0.005263	1.509579	0.1343
D99	-1.413995	0.492447	-2.871362	0.0050
D0409	5.746905	1.754039	3.276384	0.0015
JAN	-1.970709	0.742317	-2.654809	0.0092
FEB	0.655879	0.745300	0.880020	0.3810
MAR	4.311479	0.738041	5.841790	0.0000
APR	6.640503	0.744714	8.916848	0.0000
MAY	8.468931	0.757186	11.18474	0.0000
JUN	7.986937	0.744381	10.72964	0.0000
JUL	7.212380	0.747703	9.646055	0.0000
AUG	6.083845	0.753207	8.077253	0.0000
SEP	5.009872	0.771846	6.490767	0.0000
OCT	4.022179	0.757146	5.312290	0.0000
NOV	2.106664	0.761090	2.767955	0.0067

R-squared	0.829691	Mean dependent var	0.122390
Adjusted R-squared	0.798725	S.D. dependent var	3.534597
S.E. of regression	1.585749	Akaike info criterion	3.906459
Sum squared resid	248.9452	Schwarz criterion	4.352586
Log likelihood	-211.4811	F-statistic	26.79420
Durbin-Watson stat	1.697653	Prob(F-statistic)	0.000000

Dependent Variable: PRPSP4BLD

Method: Least Squares

Date: 02/18/05 Time: 14:28

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.048591	0.012242	-3.969059	0.0001
(ZWHDMTN-ZWHNMTN)/ZSAJQUS	-0.004683	0.001636	-2.863262	0.0051
PRPCUUS-9.1*NGHHUUS	0.000400	0.000407	0.981993	0.3285
PRPCUUS-100*RACPUUS/42	-0.000526	0.000557	-0.945734	0.3466

PRPSPP4(-1)-((PRPSPP4(-13)+PRPSPP4(-25)+PRPSPP4(-37)+PRPSPP4(-49))/4)	-0.194884	0.047145	-4.133728	0.0001
D95+D96	-0.030425	0.009335	-3.259296	0.0015
D0401	-0.110530	0.033493	-3.300094	0.0013
JAN	-0.027250	0.015130	-1.801030	0.0747
FEB	-0.004849	0.014755	-0.328650	0.7431
MAR	0.041786	0.014907	2.803131	0.0061
APR	0.034423	0.015048	2.287544	0.0243
MAY	0.103994	0.015309	6.793187	0.0000
JUN	0.087507	0.015142	5.779161	0.0000
JUL	0.088630	0.015193	5.833409	0.0000
AUG	0.093226	0.015240	6.117081	0.0000
SEP	0.100907	0.015238	6.622207	0.0000
OCT	0.082725	0.015017	5.508876	0.0000
NOV	0.024390	0.015068	1.618679	0.1087

R-squared	0.751460	Mean dependent var	0.003661
Adjusted R-squared	0.709208	S.D. dependent var	0.058467
S.E. of regression	0.031529	Akaike info criterion	-3.936275
Sum squared resid	0.099405	Schwarz criterion	-3.513628
Log likelihood	250.2402	F-statistic	17.78529
Durbin-Watson stat	1.940872	Prob(F-statistic)	0.000000

Dependent Variable: PRPSP5BLD

Method: Least Squares

Date: 02/18/05 Time: 14:29

Sample: 1995M01 2004M10

Included observations: 118

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.546586	0.062719	-8.714847	0.0000
ZWHDPAC-ZWHNPAC	-0.000710	0.000316	-2.244516	0.0270
PRPCUUS-9.1*NGHHUUS	0.002783	0.002052	1.356360	0.1780
PRPCUUS-100*RACPUUS/42	0.004431	0.002869	1.544192	0.1257
PRPSPP5(-1)-((PRPSPP5(-13)+PRPSPP5(-25)+PRPSPP5(-37)+PRPSPP5(-49))/4)	-0.061839	0.032202	-1.920334	0.0577
D9708	0.767121	0.176788	4.339219	0.0000

D0109	0.435636	0.177110	2.459694	0.0156
JAN	0.007107	0.077435	0.091783	0.9271
FEB	0.142843	0.077872	1.834321	0.0696
MAR	0.341649	0.077721	4.395840	0.0000
APR	0.651450	0.078697	8.277954	0.0000
MAY	0.867046	0.078937	10.98409	0.0000
JUN	0.890718	0.078305	11.37496	0.0000
JUL	0.989805	0.079064	12.51906	0.0000
AUG	0.907933	0.081908	11.08474	0.0000
SEP	0.853358	0.083340	10.23948	0.0000
OCT	0.612076	0.079536	7.695585	0.0000
NOV	0.345171	0.079730	4.329243	0.0000

R-squared	0.847366	Mean dependent var	0.010525
Adjusted R-squared	0.821418	S.D. dependent var	0.394676
S.E. of regression	0.166786	Akaike info criterion	-0.604638
Sum squared resid	2.781763	Schwarz criterion	-0.181991
Log likelihood	53.67363	F-statistic	32.65647
Durbin-Watson stat	1.934240	Prob(F-statistic)	0.000000